# hwu

The magazine of **Heriot-Watt University**

ISSUE 17

# TIDAL WAVE TRIGGER

RESEARCH INTO A POSSIBLE MAJOR THREAT TO SCOTLAND'S EAST COAST – AND HOW TO PREVENT IT

# THE WATT CLUB

→150TH ANNIVERSARY CELEBRATIONS
→ALUMNI NEWS AND ACHIEVEMENTS

LO-RES IMAGE

**INSIDE**

Welcome to issue 17 of the new look HWU Magazine, regular readers will recall that we carried out a survey at the beginning of the year asking for your feedback on the magazine and how we might develop it to meet your needs. Thank you to all who contributed and the results of your contribution is what you see today!

HWU magazine will now be published bi-annually and we have extended the number of pages to 36 to include more news and in-depth features, we hope you enjoy it!

We would also like to extend a very warm welcome to our new Watt Club members from around the world. Included with this edition for our Watt Club readers is a copy of our annual Connections supplement, wherever you are, you are not far from another alumni from Heriot-Watt! Use Connections to keep in touch with Alumni in your area through our Watt Club branches and our Ambassadors and keep in touch or re-connect with former class mates!

If you would like to contribute article ideas to the next edition of HWU Magazine, the copy deadline for the Spring / Summer edition is Monday 29 May 2006 for both the general magazine content and Watt Club sections.

To find our more contact: Kirsty Wilson, Magazine Editor, Tel: 0131 451 3598, email: news@hw.ac.uk or send your contributions to HWU Magazine, Press and Public Relations, George Heriot Wing, Heriot-Watt University, Edinburgh EH14 4AS.

For article and story ideas for the Watt Club Alumni section, please contact: Bronwyn Travers , Tel: 0131 451 3637, email: watt.club@hw.ac.uk or send your contributions to: Heriot-Watt University Magazine (Watt Club Section), Development and Alumni Office, Heriot-Watt University, Edinburgh EH14 4AS.


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|---|---|
| **Publisher** | Press and Public Relations, Heriot-Watt University, Edinburgh EH14 4AS |
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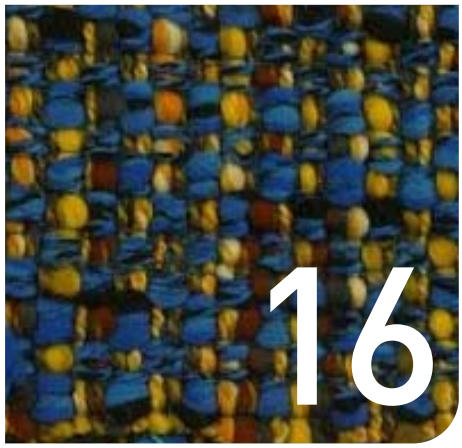






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# news round up

## Minister's SCHOLAR Study

Deputy Minister for Education and Young People Robert Brown MSP was given a special demonstration of SCHOLAR when he visited Heriot-Watt University on Monday 16 January. At the presentation Professor Phillip John, Chair of the SCHOLAR Forum outlined the development and growth of the SCHOLAR programme.

SCHOLAR, developed at Heriot-Watt, is used by all Scottish secondary schools at Higher and Advanced Higher levels in maths and sciences, and now in French at Advanced Higher level. A group of its users, seventeen year old pupils from Lourdes secondary school in Glasgow, gave the Minister a practical demonstration of how they used it in their studies and revision.

Following the demonstration Mr Brown said, "Technology has revolutionised school life in recent years and SCHOLAR is just one example of this. Scottish pupils now have a world of facts, figures and information – quite literally – at their fingertips."

## New Scholarship launched

Britain's leading paralympic athlete, Tanni Grey-Thompson DBE, visited the Edinburgh Campus in May to receive the 2005 Heriot-Watt Sports Union Honorary Blue Award. The Blue Award is presented to someone who has made a significant contribution to sport and Tanni was awarded for both her personal achievements and the work she has done in supporting sport for those with disabilities.

During her visit Tanni also launched the University's new Sports Scholarship for Disabled Athletes. The Wilson Scholarship is named in honour of the University Secretary Peter Wilson and his wife Joy after their personal contribution launched the programme. The scholarship will also receive funding from the Alumni Fund. The new scholarship follows on from the success of the University's original Sports Scholarship scheme established in 1992, which currently has 33 Scholars.

University Secretary Peter Wilson said: "There must be students with a disability who would benefit from a scholarship which would support them in participating competitively in a range of sports."

## Portrait Donated to University

A portrait of James Watt was presented to the University by one of the Scottish engineer's distant relatives. The portrait, a nineteenth century image by the Victorian painter and engineer Robert Harvey, belonged to descendants of the Muirheads of Lachope, who were related to James Watt's mother.

Seven generations on, the portrait has most recently been in the possession of Tim Trew, himself an electrical engineer and currently living in Surrey, who decided to gift it to Heriot-Watt University to be safeguarded by the Archive and Museum department. He said: "We thought the University was a worthy recipient, keeping James Watt's name alive and teaching future generations of engineers and scientists."

Heriot-Watt University Archivist Ann Jones said, "It is wonderful to have this portrait to add to our Museum collection, and we'll be sure to take great care of it!"

# In brief

## Farewell to Lord Mackay

Lord Mackay of Clashfern has retired after 14 years as Chancellor of Heriot-Watt University. One of his last official roles as Chancellor found himself in the unusual position of awarding an honorary degree to his wife, lady Mackay.

Lord Mackay was installed as Chancellor of Heriot-Watt University on St Andrews day 1991, and has since conferred degrees upon over 30,000 students. In conferring a Doctorate of the University on his wife, Elizabeth, Lady Mackay, he and the University recognised her own important contribution to the University during her husband's tenure as Chancellor.

Heriot-Watt Principal Professor John Archer said, "We were delighted when Lord Mackay agreed to become Chancellor of the University, and everyone has appreciated his commitment and contribution over the last 14 years. What we perhaps didn't initially realise was the extent to which the University would also benefit from Lady Mackay's support and commitment, and we were delighted to mark that and show our appreciation of both of them at our special graduation dinner."

Lord Mackay's retiral as Chancellor was marked at a special graduation dinner in November, and he has been succeeded as Heriot-Watt Chancellor by Baroness Susan Greenfield.

## Science and Engineering Masters Go Global

The School of Engineering and Physical Sciences has been successful in securing European Union funding to deliver two new postgraduate Masters programmes in Computer Vision and Robotics (VIBOT), and Photonics. Both programmes are collaborations with other European universities and are supported under the European Union's Erasmus Mundus initiative which provides fully-funded scholarships to suitably qualified students from outside the European Union, with a particular emphasis on candidates from India and Asia.

Professor Derryck Reid, Director of the Engineering and Physical Sciences Graduate School, said, "Competition for Erasmus Mundus funding is highly competitive and its award to Heriot-Watt University and its collaborators underlines the high quality of the VIBOT and Photonics courses. The European Union Erasmus Mundus programme enhances the visibility and attractiveness of European higher education in countries such as India and China where strong economic growth is fuelling the demand for graduates with specialist expertise in science and engineering."

A third collaborative Heriot-Watt course, the Masters in Strategic Project Management (European), has also been granted recent Erasmus Mundus funding.

## University Principal to retire

Professor John Archer has announced his retiral as Principal and Vice-Chancellor of Heriot-Watt University, as planned, after ten years in the position. This will take effect from 31 July '06.

Professor Archer said, "I have thoroughly enjoyed my ten years as Principal of Heriot-Watt and made many lasting friendships. The University has become one of the most internationally focussed in Scotland.

## Sport Scholars at Commonwealth Games

Three Heriot-Watt undergraduate sport scholars and a graduate scholar have been selected to represent Scotland at the Commonwealth Games in Australia this year.

Hockey player Adam Mackenzie (Accountancy and Finance), Rugby 7's player Colin Gregor (Urban Real Estate Management), swimmer Kris Gilchrist (Sport & Exercise Science) and swimmer Kirsty Balfour (Sports and Exercise Science graduate) travelled to Melbourne to compete in March. Good luck to them all!

## Orkney Science Festival

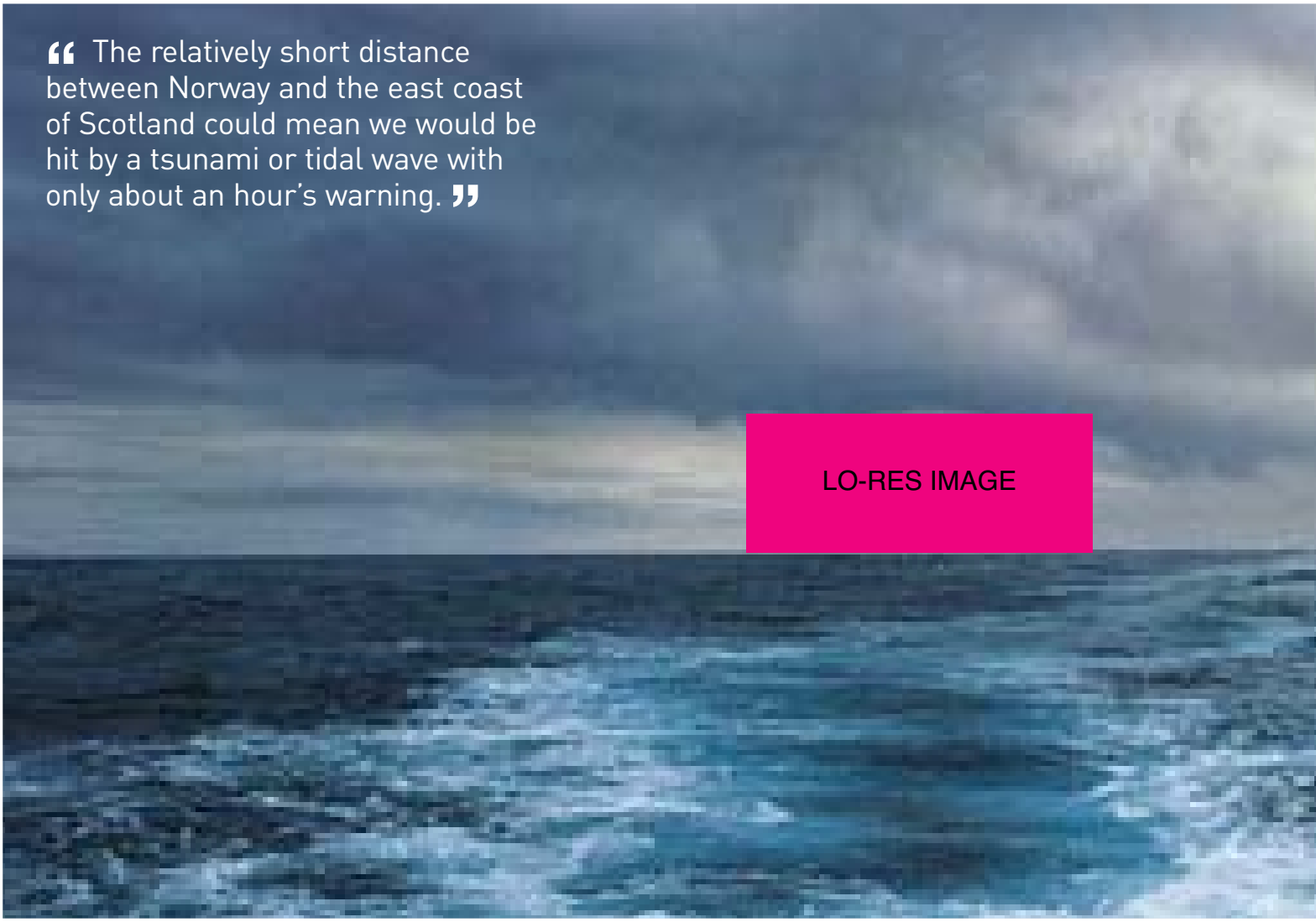
Several Heriot-Watt staff took part in a debate on renewable energy in Kirkwall as part of the Orkney Science Festival. The debate, which was chaired by Jim Wallace MSP, was organised by Heriot-Watt and the British Association for the Advancement of Science.

## New SWAN charter

Heriot-Watt is one of ten founding members of a new Scientific Women's Academic Network charter which aims to create more equitable working environments for women in science, engineering and technology through a university recognition scheme.

## New Spanish MBA

The Edinburgh Business School has launched a Spanish version of its MBA program in the summer. EBS Americas now has offices and staff established in Miami, Bogota and Mexico City.




> “ The relatively short distance between Norway and the east coast of Scotland could mean we would be hit by a tsunami or tidal wave with only about an hour’s warning. ”

# TIDAL WAVE TRIGGER

**HWU INTERVIEWS DR GARY COUPLES**

Scientists from Heriot-Watt are currently exploring the possibility of a tidal wave hitting the east coast of Scotland. Whether global warming could trigger such a wave, and what steps might be taken to prevent it, are the subjects of a new research project being undertaken by ECOSSE, the new sub-surface science and engineering joint research institute which is part of the Edinburgh Research Partnership.

Heriot-Watt lecturer and ECOSSE Director Dr Gary Couples says that the key to understanding the risk is a wealth of research know-how developed by the University's Institute of Petroleum Engineering (IPE), specifically in work relating to hydrates and the mechanics of sediments that contain hydrates.

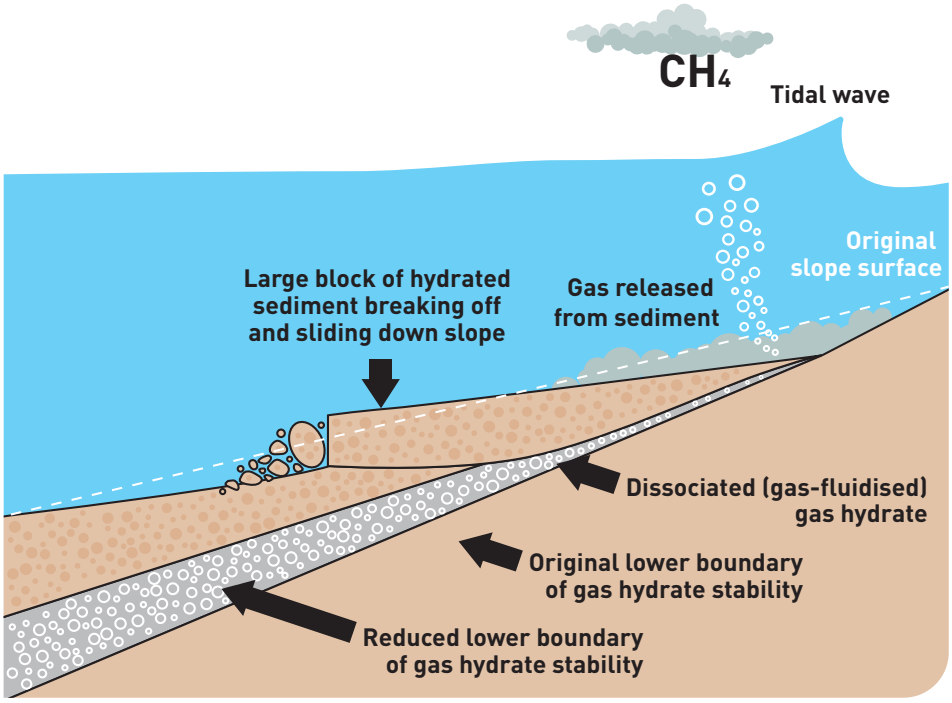
"Natural hydrates are a sort of icy slush formed naturally under the seabed when extremes of pressure and low temperature cause water and a gas (such as methane or carbon dioxide) to form a latticework in the pore spaces of the soft sediments. The Institute of Petroleum Engineering's early interest in hydrates was connected with deep-sea oil and gas production, where natural hydrates can cause problems by blocking extraction pipelines. Researchers at IPE have also been looking at the possibility of transporting gases in hydrate form rather than as the usual compressed gas and the role that may be played by hydrates to serve as a last defence against the gases that might leak from sites suggested for the storage of excess atmospheric carbon dioxide in sub-sea oil wells."

"Naturally occurring hydrates have some other important roles. For example they help to bind together the huge slopes composed of soft sediments that bury the continental margins. What we also know is that hydrates will react to the rising sea temperatures that we expect to occur as the Earth gets warmer. As temperatures rise in the oceans, the temperatures in the sediments will also rise. This means that the bottom of the hydrate zone will become shallower, leaving a thinner zone of glued-together sediments. Combined with changes in hydrate "types", these changes could lead to the slope sediments becoming unstable, and sliding away.

Another aspect is that as the hydrates disassociate, or effectively melt away/dissolve, the gas that is bound to the water is released into the sediment. This gas has a major effect on the strength of the materials, also leading to instability. If the sediments do slide away, the seabed can be suddenly dropped down, and this will cause a tidal wave. This would be particularly dangerous for the UK if it should happen off the west coast of Europe, especially Scandanavia. The relatively short distance between Norway and the east coast of Scotland could mean we would be hit by a tsunami or tidal wave with only about an hour's warning."

Archaeological evidence suggests that such a tidal wave, up to five meters high, hit the east

# TIDAL WAVE TRIGGER




**Above: As the sea temperature rises, the hydrate layer dissipates, thinning and destabilising the overlying sediments.**

**Below: As hydrates disassociate, gas that is bound to the water is released into the sediment.**

coast of Scotland at least once before, around 8,000 years ago, during the Mesolithic period. The land would have been sparsely populated by people whose forebears had crossed to Britain from the continent via what was then a land bridge, and the population at the time mainly lived around the coasts. Some of these people may have been Britain's first victims of a tsunami.

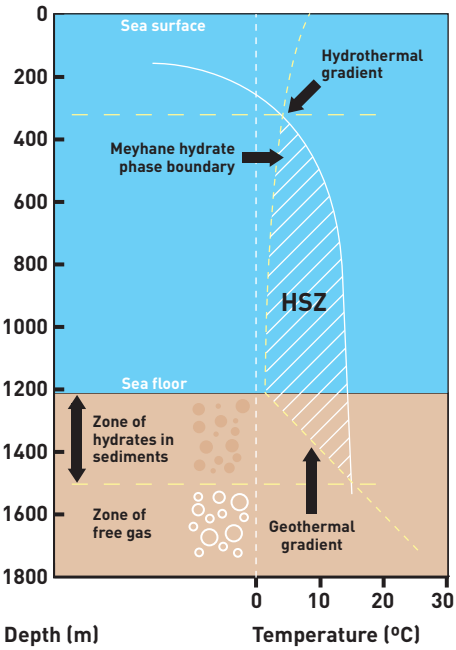
Gary is realistic about the difficulties of averting the repeat of such an event, but the first step, he stresses, is to assess just how great a risk such a scenario poses in light of current global warming predictions. The early stages of the research will be lab-based, studying and understanding the properties of hydrates and sediments and how these might alter with changes in temperatures and pressure.

The next phase, and one which Dr Couples emphasises would not have been possible until very recently, is to produce a computer simulation of whether and how these changes might lead to a major underwater landslide. "This will be a very detailed and complex model and simulation, involving the full range of linked processes which would operate on such a slope, and what effects these would have. It is often the subtle interaction of parameters and processes which determine outcome in the real world, and it is only recently that we have been able to do complex and subtle enough simulations to make a realistic prediction."

The team estimate that this first phase will take around two years, and it is only when a realistic assessment of potential risk is available that they can turn their attention to what should or could be done to mitigate the effects. "If our research confirms that hydrates will be affected by sea warming, leaving these huge slopes at the edges of continents unstable, then we don't think it is reasonable to suggest we could actually prevent such a landslide. We could perhaps consider looking at alternative ways of stabilising the sediment slopes in areas where a slippage could do most damage, like in places off the coast of Norway. Alternatively, we could look at managing a series of smaller, controlled slippages, which would dissipate the material without causing huge destructive waves."

But, depending on the levels of danger which phase one of the research identifies, the most likely outcome of the project will be some sort of monitoring and early warning system to minimise and mitigate the actual effects of the wave. This could include earthquake monitoring sensors, shallow-bore-holes into the sediment slope itself to monitor gas build-up, or monitors on the sea-bed below particularly vulnerable or unstable areas of the sediment slopes.

"After all," says Dr Couples, "tidal waves travel at 500km an hour, and in the event of an underwater landslip off the coast of Norway, that would give at best only an hour's warning before a wave hit the east coast of Scotland, possibly down as far as the north of England. In that event every minute of extra warning we could manage would make a difference to the devastation and loss of life such a wave would cause."

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The new George Davies Centre for Retail Excellence is a unique partnership between Heriot-Watt University and the leading fashion visionary George Davies. Sixteen talented and ambitious students, with a variety of experience, have been selected to study the first postgraduate course in International Fashion Marketing.

# RETAIL REVOLUTION

Earlier this year, leading fashion visionary George Davies announced a unique new partnership with Heriot-Watt. The man who founded 'Next' in the eighties, 'George at Asda' in the nineties and the per una fashion collection for Marks & Spencer in 2001, has launched the George Davies Centre for Retail Excellence at Heriot-Watt's Edinburgh Campus.

The new Centre reflects George Davies' own passionate commitment to retail excellence and will build on Heriot-Watt's strong academic reputation, its links with international business and industry, and its experience in retail management, fashion and design.

The Centre provides students with a postgraduate education and training in the whole retail fashion business, with in-company projects and master classes from leading academics and retailers, including George Davies himself.

Specialist subjects include strategic retail management, buying and merchandising, understanding the fashion consumer, fashion brand management and retail logistics.

George Davies visited the Heriot-Watt earlier this year, to meet students and the academic team delivering the course and ran his own masterclass.

Dr Davies said, "I've been working with Heriot-Watt University for a number of years, it's a great place with a fantastic team. This exciting new opportunity is unique in that it combines real life retailing with an academic course for young professionals who want to develop their careers in the industry. I've been involved in every aspect from course content to recruiting the right team and loved sharing my experience with the students on the course, via my masterclass.

"The new Centre underpins my commitment to the fashion retail sector and the way it serves the customer. It is an investment in the future of the industry in this country, and a means of developing new talent and expertise to meet the challenges of a competitive global economy. This is a personal project, I am committing to in terms of my time and whatever it takes to make it work".

> "I've been working with Heriot-Watt University for a number of years, it's a great place with a fantastic team."

Professor John Archer, Principal of Heriot-Watt, said, "This is a very exciting development for the University, and a tremendous opportunity for bright, ambitious, entrepreneurial people who will graduate with a real understanding of business and of the retail fashion industry in particular.

"These quality graduates will also be a valuable asset to the industry itself, and to ensure that they are fully equipped with the sort of transferable skills that employers need, the courses will be led by a team of experienced academic leaders complemented by leading industry practitioners."

Professor John Fernie, Head of the School of Management and Languages and Professor of Retail Marketing, says he is delighted to be working with George Davies and his team.

"I first met George when he received an honorary degree from the university in 2003, where he was awarded a Doctorate of Letters in recognition of his outstanding achievement in the field of textiles and fashion design management.

I have developed numerous courses during my career but nothing as exciting as this joint venture. To have a retail visionary of such stature offering master classes to our students and working with our staff makes this programme distinctive."

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“ Partnerships are key to the development and success of research in Scottish universities, and this is an exciting and substantive initiative. ”

# ALL TOGETHER NOW

Partnership and pooling have been the key words for research at Heriot-Watt this year, as a key player in a range of research partnership developments among Scottish universities. The largest is the Edinburgh Research Partnership (ERP), which will involve 750 researchers at Heriot-Watt and Edinburgh Universities, and is designed to make Edinburgh city a magnet for international funding and the cream of postgraduate talent.

**HWU INTERVIEWS**
**PROFESSOR DENIS HALL**

Working in key areas of engineering and mathematics, the new partnership will benefit companies working in a range of sectors, including energy, electronics, medicine and finance.

This large-scale collaboration will allow key research facilities at both institutions to be used to their full potential. Engineers, mathematicians and scientists at each University will work together to develop a shared research strategy, and pool resources where it is beneficial, and a joint postgraduate school will use the combined resources of both universities to provide high quality courses and training.

Professor Denis Hall, Deputy Principal (Research) at Heriot-Watt and Director of the ERP, said, "While the two Universities are of very different overall size, we are pretty evenly balanced in the areas covered by the ERP, in which we both have particular strengths, and this makes for a comfortable and productive partnership."

"Partnerships are key to the development and success of research in Scottish universities, and this is an exciting and substantive initiative."

With a total funding package £24m, ERP will focus on five key research areas – signal and image processing; mathematical sciences; energy systems; subsurface science and engineering; and integrated systems, incorporating microelectronics, photonics and micro-systems.

Another area now benefiting from inter-university partnership is physics, previously an area in which Scottish universities lacked the critical mass to compete at top levels internationally. SUPA, the Scottish Universities Physics Alliance, brings together physicists from the Universities of Edinburgh, Glasgow, Heriot-Watt, Paisley, St Andrews and Strathclyde in a single strategic alliance, creating the largest such grouping in the UK with over 200 academic physicists.

Key to the new group is a co-ordinated approach to research under a single management umbrella and a Scottish Graduate School in physics, with video links between the individual university sites. It concentrates on existing key research strengths, initially astronomy and space physics, condensed matter and material physics, nuclear and plasma physics, particle physics, and photonics.

Heriot-Watt's Professor Julian Jones, a member of the SUPA Executive Committee and Head of the School of Engineering and Physical Sciences, believes the developments offers tremendous opportunities. "This new research alliance will provide a formal infrastructure for research collaboration, competitive on the international stage, while allowing each department to build on its research excellence: it's the best of both worlds."

"Increasingly, modern science demands large, well-organised and synergistic teams. SUPA's vision will create an environment attractive to researchers and sponsors alike, and place Scotland at the forefront of research in physics through an agreed national strategy, an inter-institutional management structure, and co-ordinated promotion."

ScotCHEM involves two funded "pairing" initiatives; WestCHEM, comprising Glasgow and Strathclyde Universities and EaStCHEM bringing together Edinburgh and St Andrews Universities. A separate Heriot-Watt initiative is also funded.

ScotCHEM itself has been awarded a £23m funding package, with the aim of generating enhanced critical mass and allowing joint access to major resources which would previously have been restricted to single institutions.

ScotCHEM Chairman Professor Ken McKendrick, of Heriot-Watt University, explains, "Most obviously, the funding allows us to recruit more international-level academics and postgraduate students, and to improve and develop our support facilities. But pooling resources also means both developing a critical mass and making best use of the existing resources, whether specialist, analytical instrumentation, generic skills training or teaching resources for postgraduates.

"It will also allow these previously more isolated groups of scientists to interact with their peers, to share best practice and to benchmark their work against others in the field. ScotCHEM is the Scottish academic community's response to the many challenges facing chemistry today. It is an approach currently unique to Scotland, but is already attracting attention from elsewhere."

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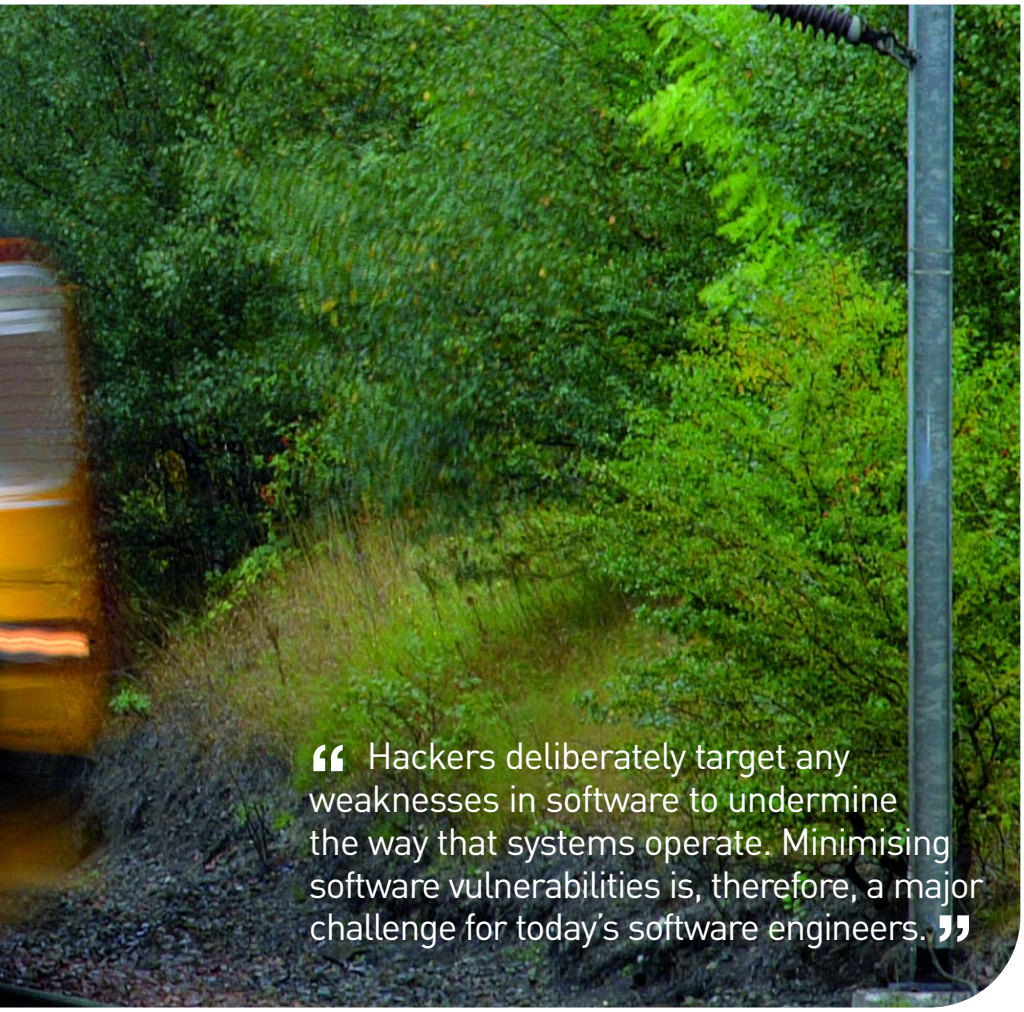
# SAFE AND SECURE SOFTWARE

A successful Heriot-Watt project which promotes the development of safe and secure software, is now looking to take these advantages to the commercial and industrial world.

The development of the European Space Agency's un-manned Ariane 5 rocket took 10 years and cost $7 billion. On its maiden flight in June 1996 Ariane 5 exploded shortly after take-off. A software failure played a central role in this disaster.

**HWU INTERVIEWS DR. ANDREW IRELAND**




Such high profile software failures may seem relatively remote from everyday life, but there is a huge proliferation of software on which we all depend for safety and security. The increasing use of software control systems within the automotives industry, for example, means an increasing need for that software to operate correctly and reliably. We’re also increasingly dependant on smartcards for everything from banking to security access to buildings. Complicating the issue further is the fact that hackers deliberately target any weaknesses in software to undermine the way that systems operate. Minimising software vulnerabilities is, therefore, a major challenge for today’s software engineers.

An approach called formal verification supports the development of safe, secure and reliable software. Formal verification has a long history within computer science, dating back as far as the late 1940’s when researchers such as Alan Turing identified the potential benefits of being able to prove the correctness of programs using mathematical logic. Since then, significant advances have been made in terms of both its theory and its application, and it has been taken up by key industrial names like Microsoft, Intel and Airbus Industries. As well as the safety aspects, there is growing evidence that formal verification can deliver savings in terms of product development costs.

Four years ago the Dependable Systems Group in the School of Mathematical and Computer Sciences launched a project to build on the success of a specific software development approach known as the SPARK Approach, which focuses on bug prevention rather than detection, i.e. build the software right first time. SPARK has been applied successfully across a wide range of applications including: railway signalling;, smartcard security; and avionics systems such as the Lockheed C130J and Eurofighter Typhoon projects for over 15-years. It was recognized by the US National Cyber Security Partnership as one of only three software development processes that can deliver sufficient assurance where system security is critical.

The SPARK Approach prevents what are known as ‘run-time errors’, which typically occur when a program stores data into a chunk of memory that is too small for it. This is just the sort of error which led to the loss of Ariane 5. The SPARK tools can check that this isn’t going to happen by using mathematical proof without even needing to run the program, rather the way an airline pilot runs pre-flight checks before the plane is allowed to start.

The Heriot-Watt team set out to improve the level of automation available with a system called NuSPADE. Throughout this period they were working in collaboration with Praxis High Integrity Systems Ltd, the original developers of SPARK. Dr Andrew Ireland, of the Dependable Systems Group, said, “Using the SPARK Approach, if the tools fail to complete a formal verification then the programmer has to intervene personally, to supply a proof and/or provide additional information about the program. What NuSPADE offers is a more automated way to get over these problems.

“We tackled these challenges from two directions, using an Artificial Intelligence technique called proof planning for automating the search for proofs, and program analysis techniques to generate program annotations. The novelty of our approach was the way in which we integrated these techniques.”

The group then received a further six month funding from EPSRC’s Research Assistants Industrial Secondment Scheme, through the University’s Collaborative Training Account. This allowed Bill Ellis, one of the team members, to work directly with Praxis to develop a prototype industrial tool called SPADEase, based upon NuSPADE.

And Praxis are impressed with the result. Peter Amey, Chief Technical Officer of Praxis High Integrity Systems Ltd., said, “SPADEase represents a very significant advance in the practical application of proof planning. It increases the proportion of SPARK-generated verification conditions that can be proved automatically without introducing any new opaque, black-box processes. The separation of proof planning from proof checking also acts as a talent multiplier by allowing proof experts to spend their time creating new and reusable methods and approaches, rather than working on individual proofs.”

Dr Andrew Ireland, of the Dependable Systems Group, said, “We’ve succeeded in developing a prototype tool which could help the industry produce safer and more dependable software, and to develop it faster and more cost effectively.

“The next step is to refine and fully integrate the developments so far, in other words, technology transfer, and we are now looking at how best to fund this. In particular, the UK’s Defence Science and Technology Laboratory (Dstl) has already shown interest in supporting SPADEase in terms of technology transfer, and we are talking to other prospective partners.”

In addition to developing SPADEase, the Dependable Systems Group conducts a broad range of research in support of dependable systems engineering. It is also launching a new MSc in Software Engineering in October 2006, which will have a strong dependable systems engineering flavour, promoting the development of skills to produce safe, secure and trustworthy software.

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# CASE FOR CONSERVATION

When the only surviving copy of the Declaration of Arbroath went on public display, it was thanks to the help of academics from Heriot-Watt's School of Engineering and Physical Sciences.

**HWU INTERVIEWS PROFESSOR BOB REUBEN**

Heriot-Watt joined forces with the National Archives of Scotland last year to design a container for the Declaration of Arbroath so it could be featured in a major exhibition to be held in the Scottish Parliament, marking the 700th anniversary of William Wallace's death.

The "For Freedom Alone" exhibition also featured the only surviving document issued by Wallace, a letter to the people of Lubeck and Hamburg.

The exhibition's title was taken from the wording of the Declaration of Arbroath, which has been described as the country's best-known historical document.

The letter was sent to the Pope by eight Scottish earls and 38 barons, calling on him to recognise Scotland's independence and acknowledge Robert the Bruce as King. The document is thought to have been drafted by Bernard, the abbot of Arbroath, during the war of independence with England.

It was sent to the Pope six years after the battle of Bannockburn, where Robert the Bruce defeated the English. The document contains the lines: "As long as but a hundred of us remain alive, never will we on any conditions be brought under English rule.

"It is in truth not for glory, nor riches, nor honours, that we are fighting, but for freedom – for that alone, which no honest man gives up but with life itself."

Four years after the declaration, Rome recognised Robert the Bruce as King.

The only surviving copy of the document was held at Edinburgh Castle until the early 17th century, when it was moved to Tyninghame for safe keeping while work was done at the castle. However, damp caused damage to the document before it was returned to the National Archives of Scotland (NAS) in 1829.

The document, drafted in 1320, has been in to frail a condition to be able to put it on public display until now.

The Heriot-Watt team, under the leadership of Professor Bob Reuben from the School of Engineering and Physical Sciences, built a hermetically sealed display case which was filled with a low-oxygen atmosphere of inert gas, slowing down the effects which cause organic materials to deteriorate.

> "It is in truth not for glory, nor riches, nor honours, that we are fighting, but for freedom – for that alone, which no honest man gives up but with life itself."

Professor Reuben, was delighted to be given the challenge but had never constructed such an item before. He explains that he had top class support: "We worked closely with a team from the National Archives of Scotland, but were also fortunate enough to receive personal guidance from Dr Shin Maekawa, a senior scientist at the Getty Conservation Institute, who is a world expert." Dr Maekawa, who designed the cases that hold the mummy collection at the Egyptian Museum in Cairo, also visited the Edinburgh Campus to advise on the final stages of the design.

The aim is to preserve the manuscript for future generations by slowing down the effects which can cause organic material like parchment to deteriorate. These include air pollution, changes in temperature and humidity, and attacks by bacteria, fungi and insects.

George MacKenzie, the Keeper of the Records of Scotland, said: "This document is one of the most important manuscripts cared for by NAS and extensive research, great care and consideration has and will always be given to ensure the long-term preservation of this irreplaceable manuscript.

"Regular exhibition of this fragile document will never be possible, but this important project may allow its very occasional display in the future."

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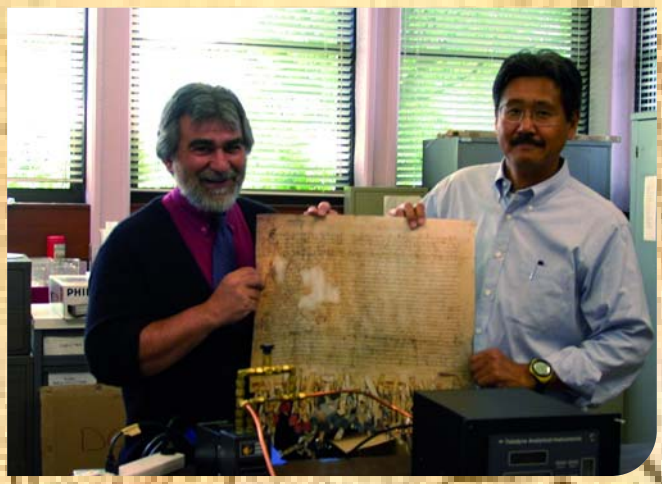

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“ The aim is to preserve the manuscript for future generations by slowing down the effects which can cause organic material like parchment to deteriorate. ”

# A PASSION FOR COLOUR

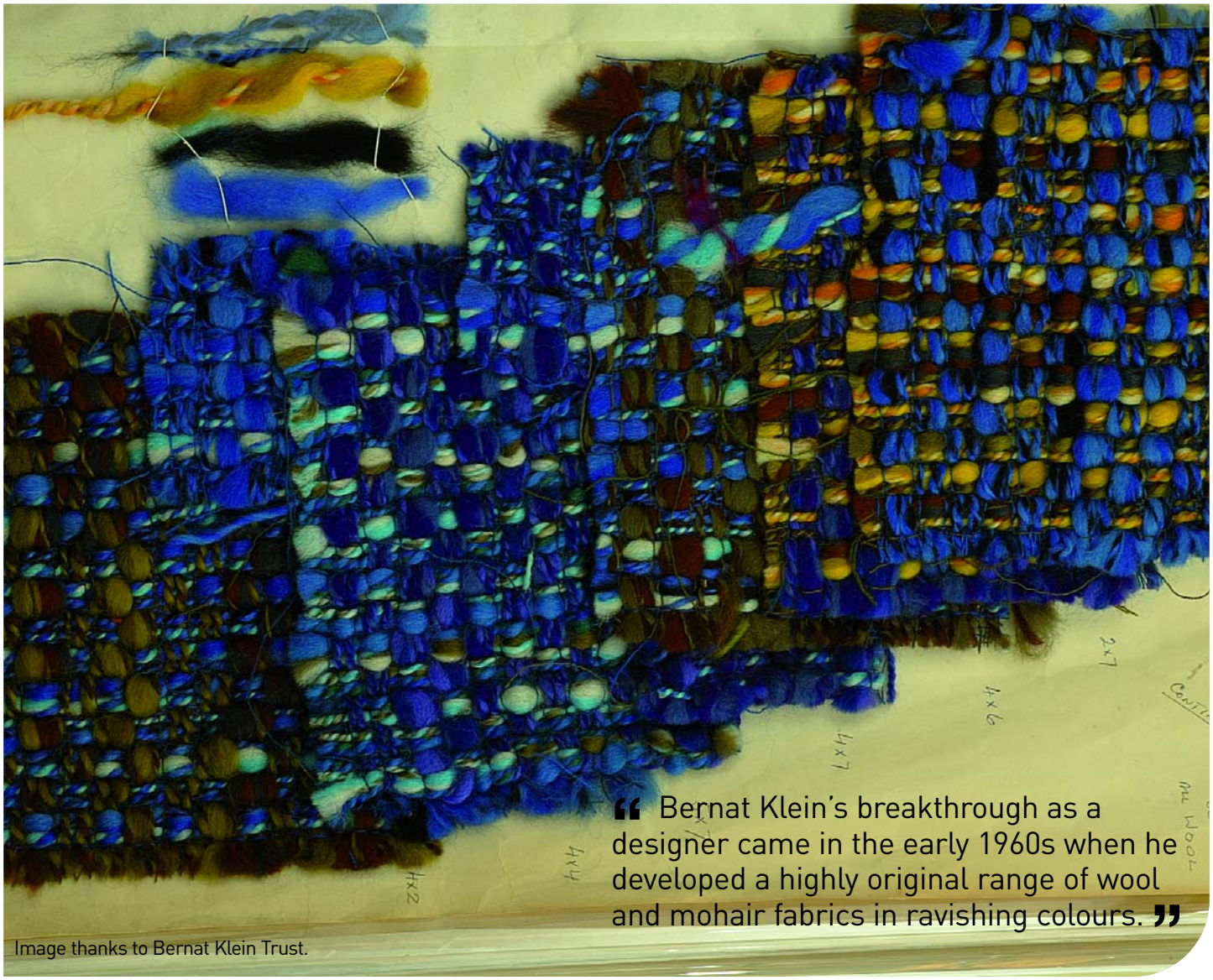
An exhibition iat Heriot-Watt's Scottish Borders Campus from 18 April – 26 May will showcase the work of world renowned textile designer, colourist and artist Bernat Klein. Based on the highly successful exhibition at the Scott Gallery and Hawick Museum last year, it will feature items from his personal collection and the University's priceless textile collection.

Legendary artist textile designer Bernat Klein is a name that many people will remember with great enthusiasm from the 1960s and 70s. A brilliant colourist and a visionary textile designer, Klein electrified the staid Borders tweed industry during the post-war era with his dazzling palette and rich textural weaves. His dynamic, paint-smeared abstract oil paintings provided the starting for his bold, colourful experiments in woven cloth. Textiles like these had never before been seen before – and have never been equalled since.

One of the most distinguished emigré designers in Britain during the post-war period, Bernat Klein was born in Yugoslavia in 1922 and educated in Czechoslovakia and Jerusalem, before arriving in the UK in 1945 to study textile technology at Leeds University. Based in the Borders since the 1950s, where he still lives today, Bernat Klein is now in his 80s, so a retrospective was long overdue. The exhibition will be staged in the High Mill from Monday 18 April – Friday 26 May and is supported by the Bernat Klein Trust. It will celebrate his achievements over five decades in both art and design, exploring the many different avenues of his diverse multi-faceted career.

Bernat Klein's breakthrough as a designer came in the early 1960s when he developed a highly original range of wool and mohair fabrics in ravishing colours. "I dreamt of cloth vibrant with colour," he said. "I wanted reds that were redder and blues that bluer than anything I had seen before." Based in the textile-manufacturing town of Galashiels, where he ran his own mill, Klein became the toast of Paris when his gorgeous, dappled, brushed mohair tweeds and sumptuous velvet tweeds were championed by top French couturiers, including Chanel, Dior, Balenciaga, Pierre Cardin and Yves Saint Laurent.

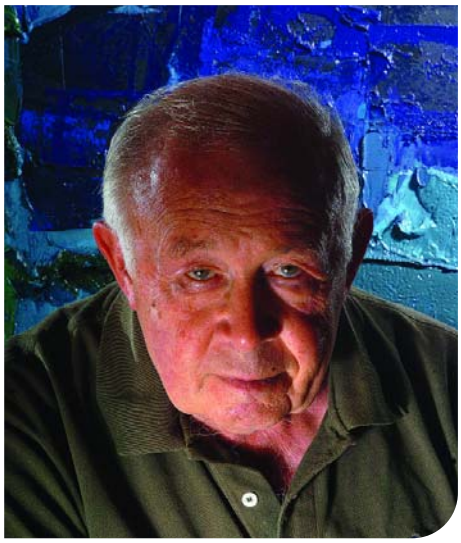
'Modern painters have strongly influenced our way of looking at colour,' Klein wrote in his book Eye for Colour in 1965, 'not only in general and in relation to works of art, but also in relation to our clothes and furnishings.' As well as highlighting the relationship between Klein's own paintings and textiles, the exhibition explores how other artists triggered his creative imagination, notably the French



> “ Bernat Klein’s breakthrough as a designer came in the early 1960s when he developed a highly original range of wool and mohair fabrics in ravishing colours. ”

Image thanks to Bernat Klein Trust.

**HWU INTERVIEWS HELEN TAYLOR**



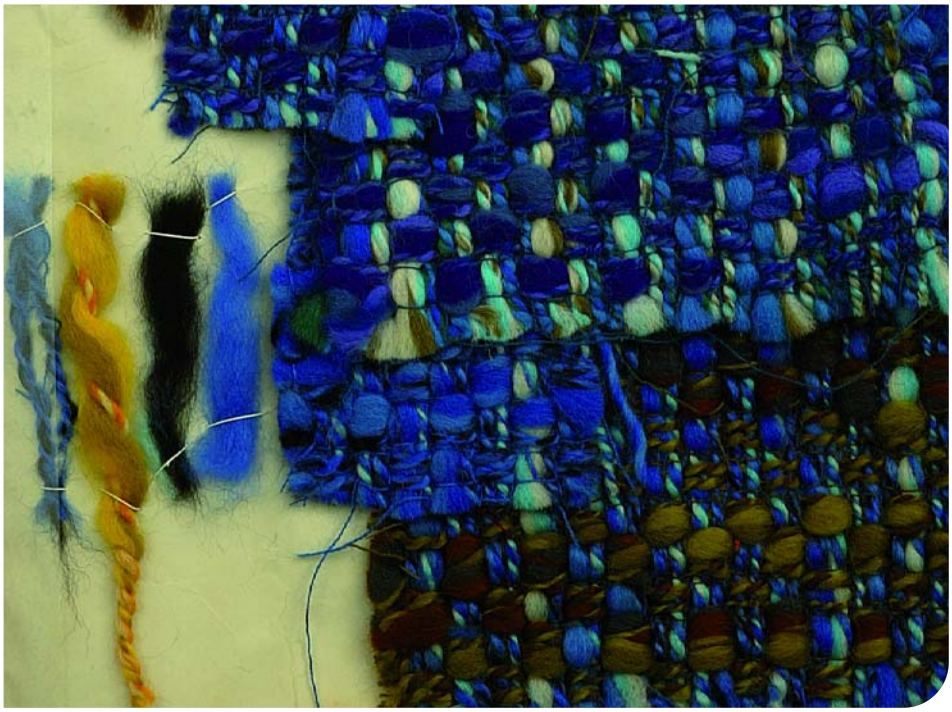
Impressionist painter Seurat. Fascinated by Seurat’s ground-breaking pointillist technique, Klein set out to translate this complex aesthetic into woven form. But instead of dots of paint, his fabrics were constructed from flecks of colour in apparently random – but carefully balanced – compositions.

Innovative yarns – works of art in themselves – provided the key to the success of Klein’s fabrics. The beautiful, subtle, mottled colouring of his mohair tweeds arose from a remarkable technique called space-dyeing, where hanks of yarn were dipped at intervals in different coloured dyes, morphing from one tone to another. Composite woollen yarns, spun from multi-coloured threads twisted together, injected further zest and spice. Thick slubby woollen yarns and artificially crinkled and looped yarns introduced other lively and varied relief textures. Novelty knitting yarns were also produced, along with simple and stylish knitting patterns designed by Margaret Klein (Bernat’s wife).

After conquering the catwalks, Bernat Klein disseminated his radical colour theories to a wider audience through his ready-to-wear women’s fashion collections during the 1970s and 80s. The whole collection was meticulously and masterfully colour co-ordinated – or colour-balanced, as Klein himself described it. Needless to say, Klein designed all the fabrics, which included painterly tweeds for jackets and coats, light slubby woven woollens for trousers and skirts, and zingy printed polyester jersey fabrics for shirts and dresses. A selection of textured

# A PASSION FOR COLOUR

(continued from previous page)



**As well as producing his own textile and fashion ranges, Bernat Klein was internationally renowned as a designer and colour consultant.**

Bernat Degree pic

> “Awarded an honorary degree, Doctor of Letters from Heriot-Watt on in July 2003, he regularly contributes to The Bernat Klein collection at the Scottish Borders Campus of Heriot-Watt University”

Klein even developed his own Personal Colour Guides – charts based on an analysis of eye colour – to help his clients choose which colours suited them best.

As well as producing his own textile and fashion ranges, Bernat Klein was internationally renowned as a designer and colour consultant. His painterly approach was particularly appreciated in Scandinavia, where he worked with a number of firms in Sweden, Denmark and Norway. His scintillating collection of woven upholstery textiles for Margo Fabrics won a Design Council Award in 1968. Such was Klein's reputation that in the late 1960s he was commissioned by the Department of Environment to design a series of Co-ordinated Colour Guides for furnishing schemes in government buildings. The range, which included carpets, curtains and printed and woven upholstery fabrics – some plain, some patterned, some textured – was presented in ingeniously-designed sample books, intended for easy use by the layman, showing how different elements could be sympathetically combined. Klein's adventurous interior decorating solutions provided a welcome injection of creative flair into the heart of the grey government machine.

Bernat Klein's revolutionary colour theories are as relevant and inspiring today as they were in the 1960s. His textiles and paintings vividly evoke the exciting artistic era in which they were conceived, yet still look incredibly fresh and contemporary today. “I've always felt the need to look and to paint,” says Klein, “and to transfer what I saw into what was closest to me – textiles.”

Klein retired in the 1990s and today he continues to enjoy painting in his home outside Galashiels. Awarded a honorary degree, Doctor of Letters from Heriot-Watt in July 2003, he regularly contributes to The Bernat Klein collection at the Scottish Borders Campus of Heriot-Watt University, which comprises of an extensive body of records, garments, knitting patterns, yarn and fabric from the early 1960s to 1980s. The collection is a rich inspiration to textile and fashion students and attracts historians of design and fashion from all over the world.

The Bernat Klein collection features in Scottish Textile Heritage Online, an internet based guide to textile collections in Scottish Museums and archives.

For the textile collection opening hours contact:

GET IN CONTACT:

Helen Taylor
Archivist
Tel: +44 (0) 131 451 3638
Email:H.E.TAYLOR@hw.ac.uk
Visit: www.scottishtextileheritage.org.uk

# AN OASIS OF LEARNING


After careful forethought Dubai was chosen as the location for Heriot-Watt's first internationally-based campus. Thanks to this new facility which opened its doors in October 2005, over 120 students based in Dubai have signed up to study for Heriot-Watt Degrees.

**HWU INTERVIEWS PROFESSOR KEITH CORNWELL, HEAD OF THE HERIOT-WATT UNIVERSITY DUBAI CAMPUS**

Dubai is the second largest of seven Emirates which make up the United Arab Emirates (UAE). It has a strong service-driven economy and a vibrant, connected learning community, and was chosen as a location because of its vibrant, safe, modern, and cultural blend of more than 180 nationalities. The government's "mega-projects" in areas such as banking and finance, marketing, retailing, information technology, hospitality and real estate, stimulated the demand for a young breed of professionals who have the right mix of skills and qualifications.

A bustling centre, recognised as the commercial capital and tourism centre of the region, Dubai is one of the most cosmopolitan cities in the world. It is a city of contrasts, where outstanding modern architecture, soaring skyscrapers and grand construction projects, like the world's tallest building and largest artificial island, stand alongside traditional Arabic buildings and suburban villas.

Dubai's Knowledge Village is a beautiful modern campus and was set up at a cost of $70 million. It stretches over 1km with an area of over 450,000 sq ft in phase 1 and 600,000 sq ft in phase 2. The overwhelming success of Knowledge Village resulted in the establishment of Academic City, which groups the world's leading universities and colleges in the same area allowing students and staff from different nationalities to interact, thereby creating a unique learning environment. The Academic City will offer various specializations and courses including research programs. Students can also easily access all facilities which include food courts, sports and recreational outlets, retail shops, learning centres, student housing, transportation, and banks.

Dubai's geographical proximity to the Middle East, Northern and Southern Africa, and the Indian Subcontinent, made it an ideal location for Heriot-Watts first internationally-based campus. The Heriot-Watt University initiative at the Academic City in Dubai will provide students in the region with a high-quality, international education without having to leave their country. Set in a purpose built campus of over 40,000 sq ft the branch campus of the Heriot-Watt University offers various programs in Management and Information Technology, with additional courses in Design and Engineering hopefully to be introduced in the near future.

Dr Abdulla Karam, CEO of Knowledge Village, says "In order to keep pace, it's a must that educational institutions adopt the latest technologies like multimedia and e-learning methods. There's a need for a paradigm shift in the education scene towards courses that suit today's requirements. This shift will not only propel the growth of the education sector but also fuel the growth of all other sectors."

"Knowledge Village seeks to provide a culture and access to continuous and life-long learning for the region and provide a 'student-centric' learning model that will help in developing a larger pool of knowledge workers."

Dr Abdulla's ultimate goal is to blend e-learning, lifelong learning, international universities and independent trainers – to form a broad-based knowledge community serving the entire region.

Professor Keith Cornwell, Head of the Heriot-Watt University Dubai Campus, explains;

"It is this proven capability of Heriot-Watt to bring high-quality degrees and research opportunities to students around the world that underpins Heriot-Watt's commitment to establishing a campus in the Academic City. A range of degree courses at undergraduate and masters level will be progressively introduced, commencing with Business and IT, and then moving to Engineering. We will also initiate research, beginning with topics of immediate importance to the Gulf region."

"Heriot-Watt University is committed to high-quality education and training in all our courses and these are accredited by the relevant professional institutions. We believe it is the quality and practicality of our courses which makes us different. Our courses follow a number of guiding principles, which mirror the values of managers of leading organisations and reflect current management thinking. We aim to educate the professionals and thinkers of tomorrow."

GET IN CONTACT:
Professor Keith Cornwell
Head of Heriot-Watt University Dubai Campus
Email: k.cornwell@hw.ac.uk
Visit: www.hw.ac.uk/dubai

# VISION FOR THE FUTURE

Heriot-Watt's School of the Built Environment is a key partner in a new centre of excellence that is set to transform eye care for patients in Edinburgh. VisioncentrE3 is the result of a partnership between University researchers, NHS Lothian, Edinburgh Council Health and Social Care and the Royal National Institute for the Blind (RNIB). By working together, these partners will offer exceptional quality of care for patients with visual impairment and sight loss.

**HWU INTERVIEWS**
**PROFESSOR PETER ASPINALL**

VisioncentrE3 was officially opened in August 2005 by Sarah Boyack MSP. The centre, which is situated in the former 'E3' ward at the Princess Alexandra Eye Pavilion, is supported by investment of over £500,000 from the partners involved and the Scottish Executive. At the launch event Ms Boyack praised the partners for integrating activities and working across inter-professional boundaries to offer a 'one-stop shop' for patients.

VisioncentrE3 offers three main services: clinical services, applied research and vision support. Heriot-Watt is leading the applied research at the new centre, which is carried out by the Visual Impairment Research Group (VIRG), a collaboration between researchers from Heriot-Watt and the Princess Alexandra Eye Hospital.

VIRG is led by Professor Peter Aspinall, formally of the School of the Built Environment and consultant Professor Bal Dhillon from the Princess Alexandra Eye Pavilion. The group has been working together since 1997 and has published over 50 papers since 2001. The team has already won several awards including a prize for the mountaineering study 'Vision at altitude' at the World Congress Meeting in 2005 and 'Team of the Year' at the UK Ophthalmology Hospital Doctor Awards in 2004.

The research combines the medical expertise of the NHS team with Heriot-Watt research into the impact of environment on visual function. By looking at a patient's lifestyle and environment the team aim to improve accuracy of diagnosis and the decision-making process for eye operations to minimise risk for patients. The main areas of research have focused on patients with age-related macular degeneration, glaucoma and cataract. Practical problems experienced by people with visual impairment are used to generate applied research projects.

Professor Aspinall explains: "We aim to improve the quality of life for visually impaired people by gaining a greater understanding of the relationship between clinical state, visual function and environmental design. We give patients practical information about their visual state and can inform them how the design of their environment may hinder or facilitate the activities they want to pursue."

A notable outcome is a new and simple self-administered vision test which patients can take home and use to change their home lighting arrangements to improve visibility. This gives patients more control over an aspect of their environment and enables them to experience direct benefits from the changes.

The team intends that VisioncentrE3 becomes not only a support and resource centre for visually impaired people, but also a centre for best practice in environmental design. For example a new kitchen has been created in the centre, funded by B&Q and designed by Heriot-Watt to meet ergonomic principles for visually impaired people.

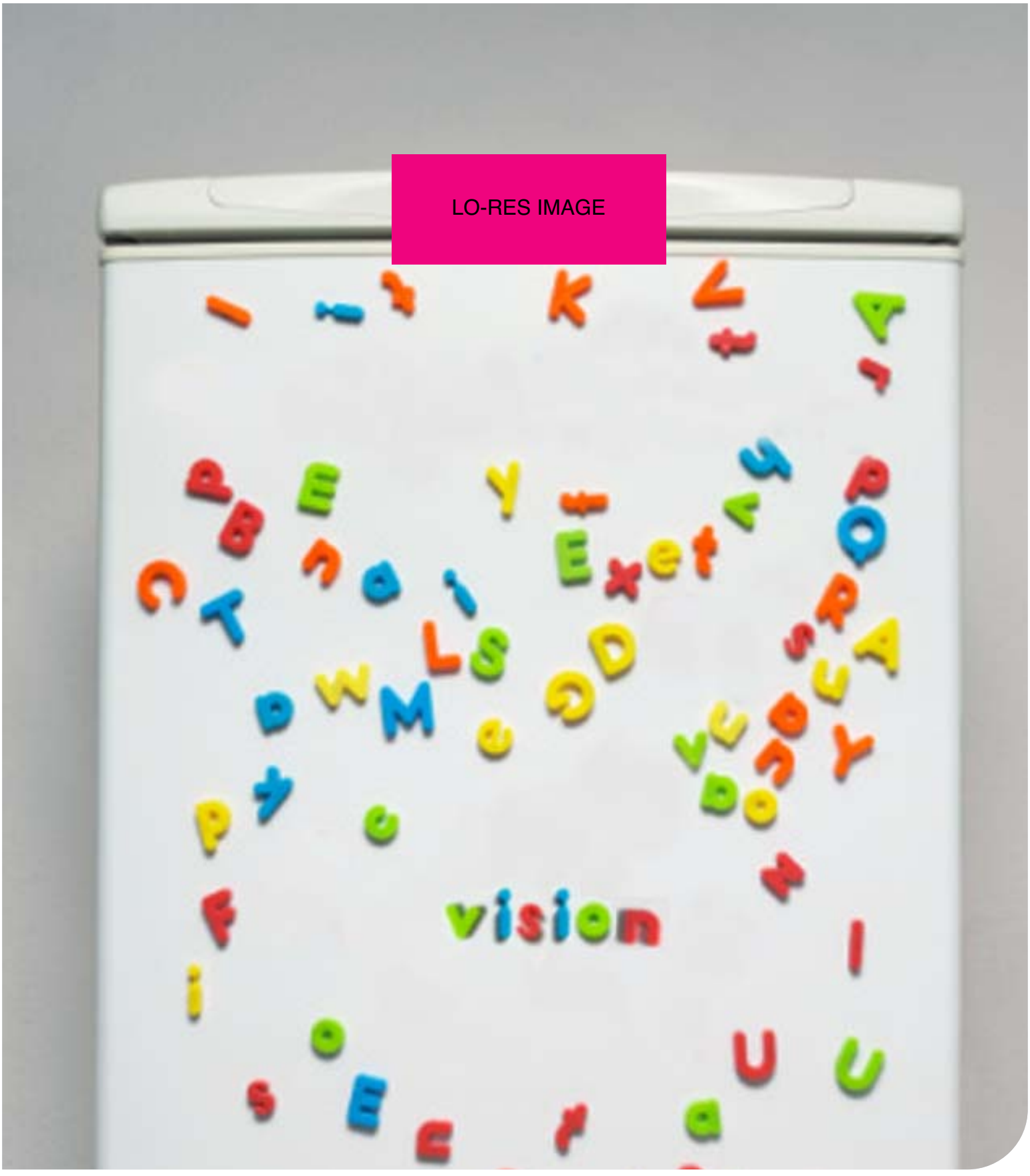
The aim of the kitchen design is to maximise visibility of objects by means of enhanced contrast, while minimising glare from bright lights. It includes features such as two different shades of work surface with a matt and non-textured finish and high contrast colours and strips for the edges of work surfaces, cupboard edges, electrical power sockets and light switches. All the design features are achievable at relatively low cost and with standard kitchen fittings.

Also linked to the research group are a number of teaching courses including a course for optometrists on diagnosing macular degeneration, and a Graduate Certificate on Inclusive Environmental Access and Design, which is taught part-time at Heriot-Watt's Edinburgh Campus. Scholarships are available for students with disabilities to attend the course.

In addition to the research at the new centre, clinical services are also offered which includes photodynamic therapy for macular degeneration and diabetic retinopathy screening. Vision Support is provided by RNIB staff, who meet patients to address questions they may have about their eye condition, offer an assessment of community care needs, and demonstrate aids to daily living.

Professor Dhillon, from VIRG, comments: "We've always tried to produce the very best service response to people who are starting to lose their vision By bringing together on one site research and support from a number of different funding bodies and agencies, we can offer the best available treatment and research facilities to patients as well as practical help and emotional support".

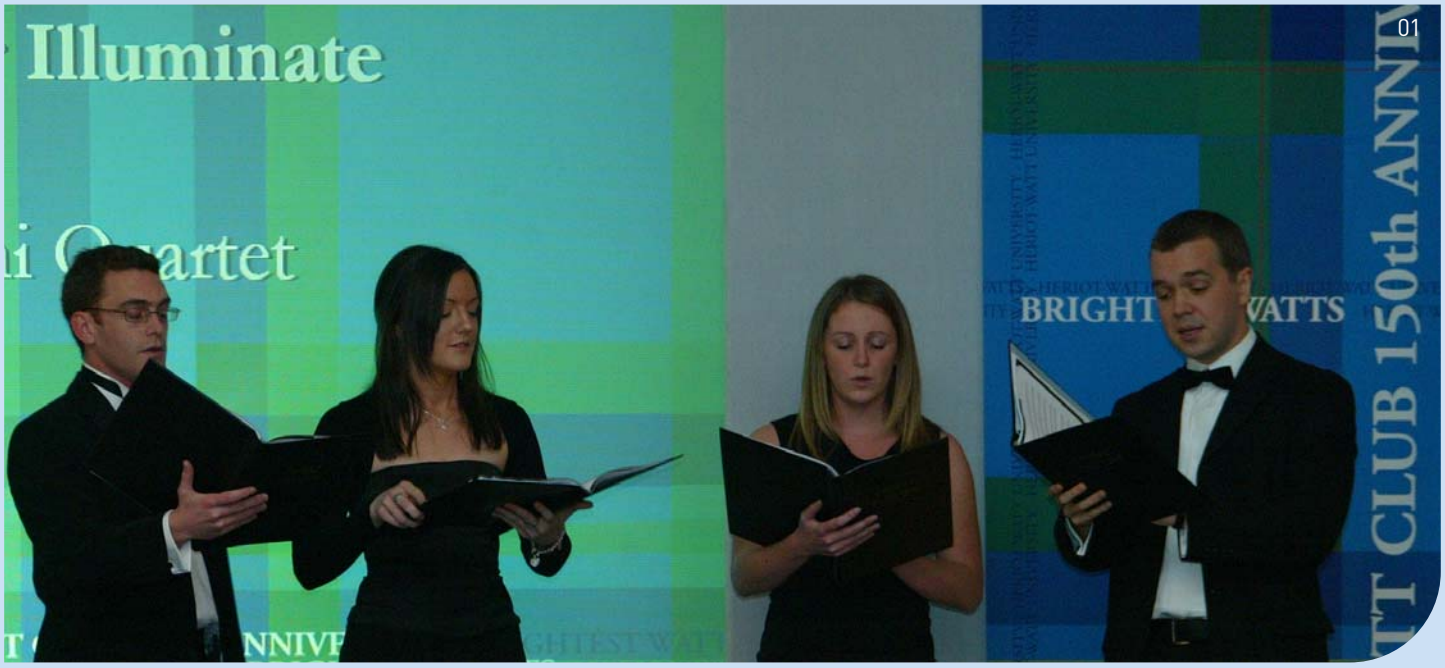
“ We aim to improve the quality of life for visually impaired people by gaining a greater understanding of the relationship between clinical state, visual function and environmental design ”



# the Watt Club

CONNECTING HERIOT-WATT GRADUATES WORLDWIDE

# 150th Anniversary Gala Dinner **Celebrations**




01

**GET IN CONTACT**
Information is available on our 150th anniversary through **alumni@hw.ac.ukor by phone +44 (0) 131 451 3408**

01
The Alumni Quartet, Excellsior Illuminate performed at the dinner.

02
Lady Mackay of Clashfern and ex-Lord Provost of Edinburgh, Eric Milligan.

From the coloured lasers lighting up the tower to the banners in the James Watt Centre, the Heriot-Watt tartan took pride of place on October 3rd 2005 at the Gala Dinner to mark The Watt Club's 150th Anniversary. Hosted by Lord Mackay of Clashfern, this milestone event for The Watt Club attracted a capacity crowd of more than 260 Heriot-Watt alumni, staff and supporters who came from near and far to celebrate.

Many contributed to the success of the evening, beginning with the Heriot-Watt Pipe Band who welcomed guests into the Centre. Once inside, the chamber music group, led by Musician-in-Residence Steve King, played while guests enjoyed a sparkling wine reception courtesy of The Worshipful Company of Distillers. Excelsior Illuminate, the alumni quartet, gave a wonderful performance during the dinner, offering further proof of the rich musical talent which has been inspired by the Music Programme at Heriot-Watt.

After a warm welcome from the Principal, Professor John Archer, to guests who included Lord Johnston, former Chairman of Court at Heriot-Watt and Mr George Davies, fashion retail entrepreneur and sponsor of the University's new MSc in Retail Fashion, the programme began with a video production to mark the culmination of the search for our Brightest Watts.

Selected by a panel led by Lord Mackay to represent the wide spectrum of Heriot-Watt influence and achievement, the final group

02

## INTRODUCTION
Dales Pearce
Watt Club President

**In 2005 we were proud to celebrate 150 years of alumni achievement. Our final group of ten "Brightest Watts" are on the web at www.hw.ac.uk/wattclub – log on to read all about their achievements.**





03
Heriot-Watt University Pipe Major, Juergen Munz.

04
The Pipe Band welcomed guests on arrival.

05
Heriot-Watt Court Member David Guest enjoys the celebrations.

06
Heriot-Watt alum, Dr Alison Golliger OBE Vice-President of Production in Schlumberger is joined by recent graduates Stuart Young (left) and Bryan Stannard.

of ten Brightest Watts reflected the historical roots of the University as well as its present and future direction. They were chosen for the ways in which they had used their skills and talents to make a difference in their fields and to society – in keeping with the tradition of the founding members of The Watt Club.

An audiovisual presentation, including interviews with staff and alumni who had nominated these individuals, gave the guests an insight into the contribution of the ten men and women who helped to set Heriot-Watt on the path to becoming the fine University that it is today.

Calling on Dr Bob Gillespie, former CEO of GE Canada and founder of the Toronto Watt Club Branch, to give the reply on behalf of his fellow Brightest Watts, Lord Mackay pointed out: "Our celebration of the achievements of the Brightest Watts of the present era allows us not only to see how far we have come as a University but to see a connecting thread between those founding Watt Club members and their successors today."

In his concluding speech for the evening, Lord Mackay urged Watt Club members to remember the significance of the University's beginnings, "Heriot-Watt was founded on the generosity of philanthropists who believed in the power of education to change lives and to change society. As inheritors of a fine tradition, we are charged with developing the University further and holding to the vision of our founders.

"To mark the 150th anniversary our priority is to raise new funds to transform the student learning environment within our beautiful campus. We believe that this will be a fitting tribute to those who founded the Watt Club and as our plans mature we will be seeking your involvement and support."

The evening concluded with guests sampling the Heriot-Watt whisky and liqueurs.

# the Watt Club

CONNECTING HERIOT-WATT GRADUATES WORLDWIDE

## Lisa Macintyre

# Treatment of burn scars

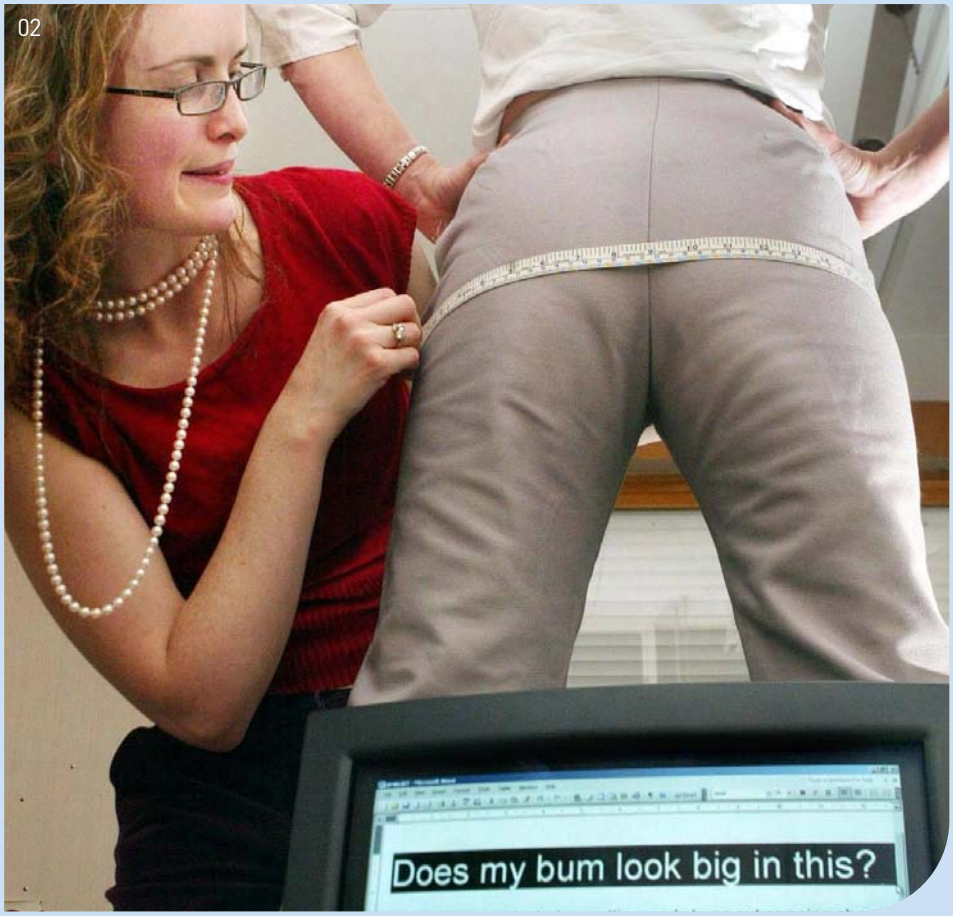
Lisa Macintyre graduated from the Scottish College of Textiles in 1994 with a first class honours Bachelor of Science in Textiles with Clothing Studies. After leaving the College she joined the John Lewis Partnership's graduate training program in Edinburgh where she was promoted to staff trainer following the completion of her training in 1995.

However, she returned to the Scottish College of Textiles to begin lecturing in 1996. While teaching a variety of subjects from statistics to knitting technology she began work part-time on her PhD entitled 'A study of pressure delivery for hypertrophic scar treatment'. She had a daughter, Anna, in 2001 and completed her PhD in 2004, for which she was awarded the Macfarlane Prize for 'outstanding contribution to the research of the University'. She has recently returned to work following the birth of her son, Angus, earlier this year. This is what she had to say about her experiences:

"I started lecturing at the Scottish College of Textiles following a chance meeting with a former lecturer, Vaughan Walker, while at work in John Lewis. Once I had settled into lecturing I was encouraged to begin study for a PhD and as a member of staff was given free choice as to my subject. Having a keen interest in technical textiles I began scouring the journals for problems in geotextiles and medical textiles. After a few months of reading I found an article on the problems associated with pressure garments for the treatment of hypertrophic burn scars and I was struck with a desire to improve their comfort and efficacy. I developed a concept of producing seamless bespoke pressure garments within hours of measurement using new technologies in 3-D body scanning and 'Whole Garment' knitting. However, the more I investigated pressure garments the more I was horrified to discover a lack of technical information or specification governing their construction. Further, there had been no scientific research into the properties of current pressure garments and practitioners did not know what pressures they were exerting on their patient's scars despite their use world-wide since the early 1970s. Therefore, I decided that there were more fundamental issues to address before the dream of instant, perfect pressure garments could be realised.

During the course of my PhD I established the diversity of current pressure garment practice in UK hospitals, developed a method for measuring low interface pressures delivered by pressure garments to human limbs and established some basic relationships that exist between the properties of pressure garments and the pressures that they exert on human limbs. Of course completing a PhD, like an undergraduate degree, is not the end of the learning process but the beginning of a life of learning. Since completing my PhD I have had the great honour and satisfaction of presenting my results to the British Burn Association – the surgeons, doctors, nurses and therapists who treat UK burn victims – and of publishing papers on the subject in the journal BURNS. Since then thanks to the support of the University and the School of Textiles and Design (SCoT merged with the University in 1998) I'm now supervising a Watt graduate who is continuing to research pressure garments where I left off.

Reflecting on the process of studying for my PhD my overwhelming feelings are of enjoyment, excitement and gratitude for the opportunities the process afforded me. I can't recommend the experience highly enough – it is an amazing opportunity to learn about and develop not only the subject you're studying but yourself, your skills and how to learn.




No subject holds fear for me now; I feel a great confidence that knowledge I do not currently possess is only time and effort away from being mine. As for balancing PhD, lecturing and parenthood the experience has been challenging but extremely rewarding and the enjoyment generated by each has given me energy and enthusiasm for the others. I also benefited from excellent supervision in the form of Dr Margot Baird and support from my colleagues in the School and wider University.

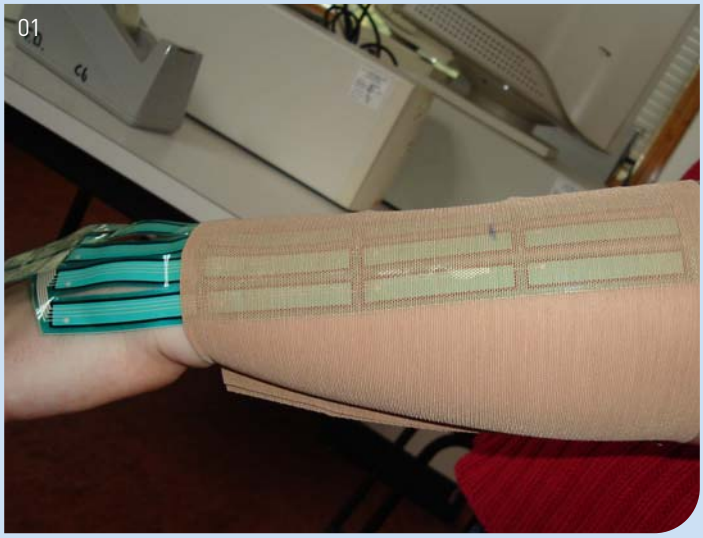
Lisa recently received widespread global media coverage for her new area of research – the world's first scientific study into how clothing can affect the appearance of the female rear. The team from Heriot-Watt University's School of Textiles and Design in Scotland believes the study could have major implications for retailers. Female volunteers wearing hundreds of different types of clothing will have their rears photographed for the research. The study will then examine how various designs, colours, patterns and fabric types affect perception of bottom size. Keep an eye on the University news and events website (http://hw-news.hw.ac.uk/) for updates and results of Lisa's study.

**GET IN CONTACT**
Information is available by telephoning **+44 (0) 131 451 3408** or by sending an email to **alumni@hw.ac.uk**

01
Lisa's PhD research into burns has been widely praised

02
Lisa is now researching how different clothing can affect how big your rear appears.

03
Lisa with her children Angus and Anna




# the Watt Club

CONNECTING HERIOT-WATT GRADUATES WORLDWIDE

## Carey Goodman

# Amazing MBA Achievement

Carey Goodman did not let her blindness hold her back in her MBA in November 2004. She achieved this award through a combination of Braille reading, the help of readers and computerised screen reading programmes.

Carey, who lives in Florida, is an International Business Strategist for the family-owned global textile company, Boehme Filatex, Inc. and started the MBA distance learning programme in July 2000. Enthusiastically she states: "I trace my interest in international business transactions to the extensive travel I undertook from a very young age and being exposed to other cultures".

After receiving a BA in International Relations in Florida, Carey completed and a Juris Doctorate in Miami, her studies for the latter focussed on international business and legal transactions. "These skills, combined with the increasing globalisation of the textile and apparel industries, made the position of International Business Analyst seem a natural fit". Armed with her well-earned MBA, she delightedly reports: "The knowledge and skills I gained from the Heriot-Watt MBA program gives me more confidence and insight in dealing with various organisational processes…. It gave me valuable understanding of the practical workings of business, trade, and finance from a very globalized perspective which few MBA programs provide". This view is shared amongst our graduates who firmly believe that Heriot-Watt courses adequately and practically prepare young people for their chosen careers.

Her time is not only given to professional obligations, but also to community service boards, education and charitable organisations as well as being involved in all levels of politics. Where does she find this unlimited energy and enthusiasm? Carey knows no bounds: "Through good discipline and planning, I mentally set a deadline for each task and eliminate it from the list as efficiently as possible. This is one sure way to negate procrastination, which of itself destroys any semblance of balance."

In her business, she takes on projects and regards these as "an indication of other people's confidence in your abilities and expertise. Ultimate success does not derive from perfunctory half measures. Persistence is essential."

Because she is blind, she relies on readers and computerised screen reading programmes for her educational and work activities. Reading aloud obviously takes longer and negates "skimming and scanning" and reading Braille is even slower. Her examinations were provided in Braille by Edinburgh Business School and she was allowed to type her responses on a computer equipped with a screen reading programme and given extra time to complete the examinations. Carey sums up her feelings at the end of her degree. "Without doubt the benefit of the courses exceeded their logistical challenges." The MBA is another award to her long list of achievements and all by the age of 30.

**GET IN CONTACT**
Information is available by telephoning +44 (0) 131 451 3408 or by sending an email to alumni@hw.ac.uk

# Calling all alumni

On behalf of the students at Heriot-Watt the Development and Alumni Office would like to extend a massive 'thank-you' to our generous alumni, after the 2005 telephone Calling Campaign generated £48,000 in pledges for the Alumni Fund. This money will provide student scholarships and help those facing hardship during their studies. Every pound raised will go back to our students so every pledge received has been hugely appreciated.

A team of eight Heriot-Watt students spoke to over 1000 alumni during November and December last year, and reconnected many alumni with the new developments at the University.

The callers, from a range of disciplines at Heriot-Watt, were: Silke Shipley (Architectural Engineering), Bob Smart (International Business and Languages), Tracey Small (Physics), Roddy Christie-Henry (Mechanical Engineering), Susan Grime (Languages and Intercultural Studies), Brook McLaughlin (Management), Mairi McDonald (Languages and Intercultural Studies) and Rebecca McCreath (Management).

The student-led campaign was a home-grown affair, run by the Development and Alumni Office with support from the Students' Association and the Sports' Union.

It's not too late to contribute to the Alumni Fund – income generated by the calling campaign goes straight back to the students and your kind donations, no matter how big or small, are of huge benefit to the students of Heriot-Watt University. For more information, please contact development@hw.ac.uk or call our office on +44 (0) 131 451 3408.

# Help make **a difference**

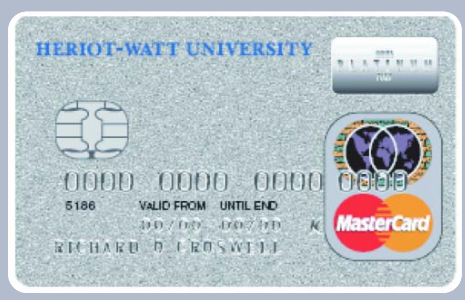
**Have you heard about the Heriot-Watt University Credit Card? As our only official credit card, it has been carefully designed to both support the Heriot – Watt University and provide great value with attractive rates and benefits.**

**This card has a fantastic 0% p.a. on balance transfers* for nine months from the date your account is opened and a typical rate of 15.9% APR (variable). And that's not all, the Heriot-Watt University Credit Card is packed with great benefits…**

- No annual fee
- Up to 56 days interest free on card purchases‡
- FREE 24 hour Customer Satisfaction Helpline
- FREE fraud protection – even on the Internet†
- The convenience of online account management
- Up to three additional cardholders at no extra cost
- Use of over 630,000 cash machines in most countries throughout the world◊

**It all adds up to a great deal for you.**

**Apply for the Heriot-Watt University Credit Card today by calling 0800 028 2440 and quoting Heriot-Watt.**




‡ As long as you pay your statement balance in full and on time every month.
† As long as you tell us as soon as your card cannot be found or you notice any unusual transactions on your account.
◊ For up to date information or advice on using your credit card worldwide or to withdraw cash, please contact our Customer Satisfaction Helpline 24 hours a day on Freephone 0800 062 062.

*We will charge the following handling fees: for all balance transfers and cheque transactions, 2% of the amount of each transaction (minimum £3); for all cash transactions (which include money transfers), 3% of the amount of each transaction (minimum £3). There is an annual fee of £0. The maximum amount of credit which may be provided under the agreement is £50,000. The minimum monthly repayment is the lesser of 2.25% of the balance shown on the statement (min £5) OR the charges for Payment Protection Cover, plus interest charged on the statement, and fees, plus £5, OR the full balance shown on the statement if this is less than £5. The typical APR on card purchases is 15.9% APR (variable) and is calculated on the basis of a credit limit of £1,500.

The Heriot-Watt Credit Card is issued by MBNA Europe Bank Limited, Registered Office: Stansfield House, Chester Business Park, Chester CH4 9QQ. Registered in England number 2783251. Credit is available, subject to status, only to UK residents aged 18 or over. You cannot transfer balances from another MBNA account. We will monitor or record some phone calls. MBNA is authorised and regulated by the Financial Services Authority.

# the Watt Club

CONNECTING HERIOT-WATT GRADUATES WORLDWIDE

## Dales Pearce

# Sustainable Pensions

Heriot-Watt found a passionate supporter of a University's Alumni Association in Dales Pearce. Dales graduated in 1994 in Actuarial Mathematics and Statistics.

Dales is Fellow of the Institute of Actuaries, an Associate of the Pensions Management Institute and Senior Consultant with actuaries Watson Wyatt. However, he wears many hats within the University, being a member of Convocation and President of The Watt Club, Heriot-Watt's alumni association. He also helps with the mentoring programme, which encourages undergraduates to focus on long-term career planning.

On his chosen career, Dales says: "Actuarial consulting offers an opportunity to apply a technical discipline in an environment where communication to non-specialists is key. Long-term saving is a critical issue, and actuaries can help their clients to understand and manage their risks." He encourages other students to follow in his footsteps, "I enjoyed my time at Heriot-Watt, and the course was an excellent route to qualifying as an actuary."

Much has been written in the press about the perceived "pensions crisis." In this article, Dales outlines the issues and offers a vision for a more sustainable system.

There is almost universal agreement that the pension system is not working and will not deliver desired outcomes, especially given the challenges of an aging population. "However", Dales comments, "these challenges have only highlighted structural faults in the pensions system that were already emerging."

The pensions framework is not compatible with the capabilities and objectives of the parties in the pension process: government, employers, financial services providers and consumers. Employers are surprised that they have become quasi insurance companies; financial services providers that they have become an extension of the welfare system and expected to operate as if non-profit making. Dales adds: "The more affluent are frustrated at the restrictions that apply to their pension savings and the less affluent are incentivised to be spendthrift by means tested state benefits." Government is left trying to manage socially undesirable outcomes and the dissatisfaction of all parties.

Should the government ensure complete pension coverage of the population at least at an adequate level, or help people to accumulate enough assets for a comfortable retirement? Current policy is failing to deliver adequate provision for many of those on moderate to low incomes, who tend to be in smaller companies, high turnover jobs, interrupted careers and self employment. Compulsion or incentives to save would probably not work in such circumstances. More bureaucracy does not sit comfortably with promoting enterprise. Reduced take-home pay is unpopular for people subject to financial pressures and it may not represent sound finance for those who have debts to clear or businesses to develop. So what is the solution?

Dales adds: "It is difficult to see how these problems can be addressed other than through an increased state pension. Although an effective solution cannot be costless to taxpayers, increased benefits could be skewed to older retirees. The age defining the starting point for "older" could be indexed to longevity, keeping a cap on cost. Means testing of state benefits would be reduced."

Having put in place this basic building block, those with disposable income or supportive employers could be encouraged to save in a flexible and less confusing regime. Current tax incentives look weak given that pension savings must be locked away for life. A structure focusing tax breaks on the first pounds of pension contributions, with lower incentives at higher contribution levels could help more people to achieve viable private pension savings without additional cost to the taxpayer.

Summing up, "Perhaps we need a clearer system in which adequate pensions for all are provided by a simpler, affordable, but better financed state pension, and where additional pensions are delivered by a private sector better able to offer innovative solutions in a less constrained environment."

**GET IN CONTACT**
Dales can be contacted on +44 (0) 131 221 7817. More information is available at www.watsonwyatt.com.

# the Watt Club

CONNECTING HERIOT-WATT GRADUATES WORLDWIDE

## Mel Young

# Homeless World Cup

It was about seven years ago that they finally found a label for me. He's a social entrepreneur, they said, and it summed my work up perfectly. I'd never been able to fit neatly into any box and now I'd found a home.

All businessmen and women aren't necessarily entrepreneurs even if they are brilliant. Only a small percentage are but they are recognised as being a particular brand of person in the business world and a lot has been written about their role. Social entrepreneurs are similar except they work in the social world and measure their profit, rather than pounds and dollars, but in positive social outcome.

Since June 1993 I have been working to tackle poverty and homelessness in particular. I co-founded The Big Issue in Scotland and I've been involved in spreading the idea of homeless people working for themselves in an atmosphere of "a hand up, not a hand out" throughout the world. I'm President of the International Network of Street Papers (INSP) which is like a trade association for street papers all over the world. INSP members now have a combined annual circulation of 30 million a year with thousands of homeless people changing their lives as a result of their involvement with the street papers.

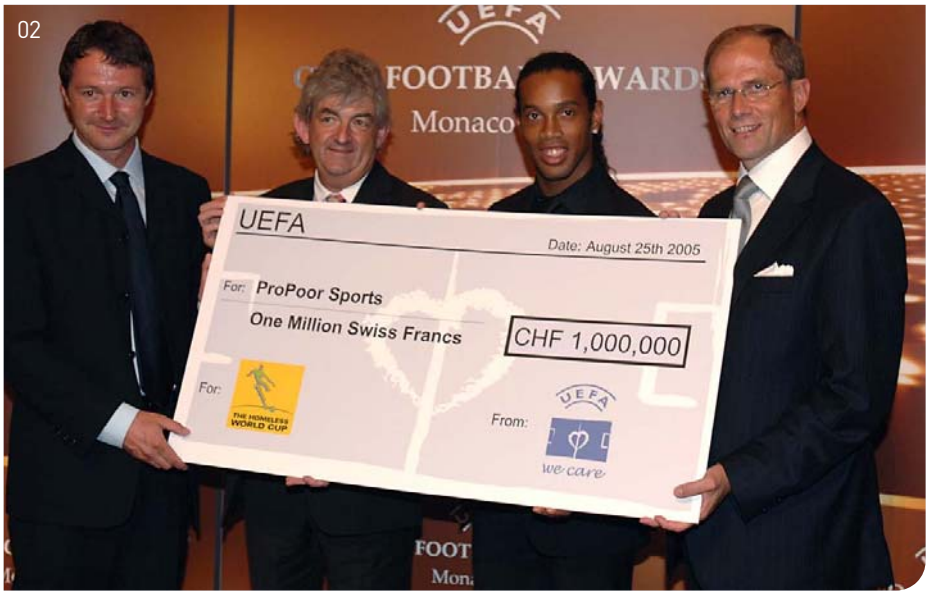
Being a typical social entrepreneur I've moved onto other projects and my involvement with INSP is now in a non-executive capacity. I'm involved in two relatively new projects. I've started a fair trade and ethical lifestyle magazine called New Consumer which is available on subscription throughout the UK. If we are to tackle global poverty then simple charity is not the answer. We must find long-term sustainable answers and I believe that if you want to achieve significant results you must involve the people who are actually living


01

in poverty. Fair trade is a perfect example of this idea where the richer people in the West buy quality products from people in the poorer South who are in turn being paid a proper wage. New Consumer exists simply to promote the growing range of fair trade products which are available.

My second project has a much higher profile and has achieved a great deal of media coverage recently. In 2001 along with a colleague, Harald Schmied from Austria, we invented the Homeless World Cup when we were having a beer following a conference in Cape Town. We simply thought that football was an international language and that it was a way of involving homeless people in a sport which might change their lives. We simply went ahead and organised it and the first Homeless World Cup was held in Graz in Austria in 2003.

02




01
Mel Young – social entrepreneur

02
Mel Young with Barcelona star Ronaldinho and representatives from UEFA.

The Homeless World Cup is based on the rules of street soccer. In Graz 18 teams took part, each representing their own country. It was very moving to see the players standing singing their national anthems out loud. Real transformations took place. The players changed out of all recognition as they gained self-respect and confidence. They signed autographs just like professional football stars as the crowds in the over-flowing stands cheered and clapped their approval. Our social impact studies afterwards showed that the huge majority had moved on into houses, jobs, training and many had come off drugs and alcohol as a direct result of their involvement in the competition.

We were so pleased with the outcomes that we organised a second event in Gothenburg in 2004 with 26 teams and in 2005 it was held in Edinburgh with 27 teams after the venue had to be changed from New York due to visa issues.

Due to its success we are now beginning to implement very ambitious plans to spread this street soccer across the world and involve anyone who is homeless or who is living in poverty. The project is easy to take to scale and with an estimated minimum of 5,000 taking part throughout the year globally in 2005 we have high hopes of increasing that number substantially in the future. The 2006 Homeless World Cup takes place in Cape Town.

My time at Heriot-Watt was very important to me. The professors, lecturers and tutors all paid their part but it was the whole university life which influenced me profoundly. I met a great many characters when I was there and my only regret is that I have lost contact with so many. Whenever I bang into them, in some ways it's as if we'd just seen each other the day before. I'm often in the eye of the media these days and sometimes they ask me what are the important influences on my life. I always say that my time at Heriot-Watt was one of them because it really helped shape my whole way of thinking about life.

**GET IN CONTACT**
Information is available by telephoning +44 (0) 131 451 3408 or by sending an email to alumni@hw.ac.uk

# the Watt Club

CONNECTING HERIOT-WATT GRADUATES WORLDWIDE

## Alan Shaw

# Every time it rains, it rains...

**GET IN CONTACT**
Information is available by telephoning +44 (0) 131 451 3408 or by sending an email to alumni@hw.ac.uk

01
Alan's career has taken him to Portobello, Burham, Aldershot, Australia and the Gulf of Carpentaria, among other places worldwide

02
Alan and his wife Marjory were married for 64 years.

"...pennies from heaven! " With a twinkle in his eye, young Professor Maurice G Say quoted the 1935 "top of the pops" lyric to introduce his lecture that year on "Hydroelectric power." He went on to explain how many of those pennies had to go towards annual capital charges for the civil works and various items of plant – the difference between pure science and engineering. He was a brilliant lecturer – and so was Milne in Physics. I looked forward to these star turns, the wordsmiths of the Heriot-Watt College.

In 1939, having obtained my AHWC and completed a two year sandwich course at Bruce Peebles Limited I spent the last peacetime summer as a six month trainee at Portobello Power Station, along with David Jack of Glasgow University. Each day we changed the charts on every recording instrument in the station, noting down the essential figures. We each in turn calculated the station thermal efficiency. On a good week it was over 22 per cent!

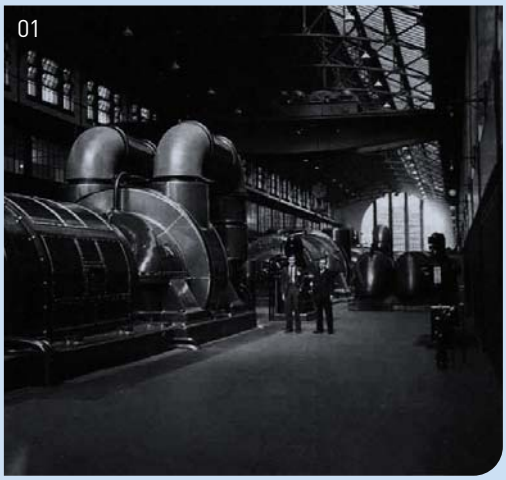
I loved the big 30 megawatt turbines, the latest quietly spinning at 3,000 rpm. We learned all there was to know about the station in our six-months tenure. Many of the staff were ex-Royal Navy or merchant marine and the station gleamed. On hot summer days David and I would take the station rowing boat out to the condenser water outfalls offshore and sunbathe. But we also worked hard!

On 16th October 1939 a twin engined German bomber flying towards the Forth Bridge at zero feet, roared overhead, hotly pursued by two Spitfires each with eight machine guns showering the power station roofs with brass cartridge cases. But by then David was back at University and I was a Sapper officer at Aldershot.

Returning to the UK from Burma six years later I joined Metropolitan Vickers (MV) at Trafford Park, Manchester. Here the turbines were the biggest in the world. In the winter of 1946, to further my career I wrote a technical paper for MV. After our evening meal, while my wife Marjory was breast feeding our first born, she used her experience as a school teacher to criticise my speaking technique night after night. For many weeks afterwards she could faultlessly recite great swathes of "The Theory of A.C. Circuit Breaking." Yes, I did win the Prize!

In January 1955 I became a member of MV's nuclear power consortium AEI-JT and by chance developed a side-line in lecturing on nuclear power. At overseas conferences, my foreign colleagues did not know what AHWC meant so gave benefit of the doubt by addressing me as "Doctor"!

At the Quadrennial Conference of the Electrical Engineers of Liege- they still exist – Marjory found impeccably groomed Continental engineers vying with each other to kiss her hand. This engineering she enjoyed the most!


01

In a trip further afield I toured prospects in Australia. Mount Isa Mines in Queensland where lead, copper, silver and zinc ores sparkled underground and poisonous snakes lurked under the cotton wool clouds and blue skies above. Befor heading up to Evans Landing, Weipa, in the Gulf of Carpentaria, conducted by geologist Evans in person.

There he had discovered the biggest bauxite field in the world lying ten feet thick on the surface and extending over 200 square miles, 25 per cent pure aluminium. Life was hard in a mining camp. After finishing dinner by the campfire at about 10 pm our hosts would drag us off in boats to shoot crocodiles. Privately, I wondered if I would ever see home again.

Now, fifty years later, I content myself explaining to politicians what Professor Say said about pennies from heaven and hydroelectricity. But this time it's about wind turbines!

My wife Marjory (also from Edinburgh) and I were very happily married for nearly sixty four years and that was a tremendous bonus. We much enjoyed sailing and travelling together and many other activities.


02

# events
## March '06 - June '06

### Edinburgh Lecture – "Legless but smiling"

**Dr. Norman Croucher OBE**

**Thursday 30 March 2006,**
**Heriot-Watt University,**
**Edinburgh Business School**
**Auditorium, Edinburgh Campus**
**7.00pm**

**SOLD OUT**

The 14th series of the Edinburgh Lectures is to feature the extraordinary Dr. Norman Croucher, an Honorary Graduate of Heriot-Watt. In his lecture "Legless but smiling" he will encapsulate the inspiring and remarkable spirit that has seen Dr. Croucher, a double below-knee amputee, take on the challenge of climbing one of the 14 highest mountains in the world, Cho Oyu, and the sense of humour and resilience that has seen him turn this life changing experience into a chance to promote, educate and motivate people of all ages and abilities. This lecture is a unique opportunity to see the world-class speaker for yourself.

CONTACT
+44 (0) 131 451 3618
events@hw.ac.uk

**30 MAR**

### Riding of the March

**Saturday 6 May 2006,**
**Heriot-Watt University,**
**Edinburgh Campus,**
**12.45pm**

The annual Currie Community Riding of the March will be precessing through the Edinburgh campus. This traditional and proud civic event has its origins dating as far back as the 13th century.

The Rides Ensign and Equerry will be escorted through the University by the University Pipe Band and exchange rosettes with senior University representatives at the James Watt statue. All are welcome to attend the event.

CONTACT
+44 (0) 131 451 3618
events@hw.ac.uk

**06 MAY**

### Heriot-Watt Choir and Orchestra Concerts

**Sunday 4 and**
**Monday 5 June, 2006**
**St. Giles Cathedral**
**Royal Mile, Edinburgh**

June sees another fantastic opportunity to see the Heriot-Watt Choir and Orchestra perform in the incredible surrounding that is St. Giles Cathedral in the heart of Edinburgh's historical Old Town.

On June 4 at 6.00pm the Heriot-Watt Choir will perform an evening of Great Early Choral Music including Missa 'L 'homme Arme' by Dufay and on June 5, the Heriot-Watt Orchestra will be performing some of the great Last Symphonies including Mozart's Symphony no. 41, the 'Jupiter' and Haydn's Symphony no. 104, the 'London' from 8.00pm.

CONTACT:
Steve King
Musician in Residence
+44 (0) 131 451 3705
s.king@hw.ac.uk

**04/05 JUN**

### School of Textiles and Design Fashion Show

**Monday 15 May 2006**
**Volunteer Hall, Galashiels**
**Friday 19 May 2006**
**Mansfield Traquhair, Edinburgh**

The latest creations by students from Heriot-Watt University's Scottish Borders Campus are set to capture the fashion world's attention when they are publicly unveiled this May.

The annual fashion show of Heriot-Watt University's School of Textiles and Design is a hotbed of inspirational textile and fashion design from some of the UK's most sought after graduate designers. This year's shows take place on Monday 15 May, in the Volunteer Hall, Galashiels and Friday 19 May in the Mansfield Traquhair, Edinburgh.

To find out more and to book your tickets for these catwalk shows contact:

CONTACT:
Ian McInnes
+44 (0) 1896 892233
i.m.mcinnes@hw.ac.uk

**15 & 19 MAY**

### Heriot-Watt University Graduation Dates 2006

**The graduation ceremonies for this year are to take place on the following dates:**

**Scottish Borders Campus – Friday 7 July, 11.00am**
The ceremony will be held at the Old Parish and St Paul's Church, Scott Crescent, Galashiels.
**Edinburgh Campus – Tuesday 11 July, 10.30am**
(Edinburgh Business School and School of Life Sciences)
**Edinburgh Campus – Tuesday 11 July, 2.15pm**
(School of Management and Languages and Educational Development Unit)
**Edinburgh Campus – Wednesday 12 July, 10.30am**
(School of the Built Environment and School of Mathematical and Computer Sciences)
**Edinburgh Campus – Wednesday 12 July, 2.15pm**
(School of Engineering and Physical Sciences and Institute of Petroleum Engineering)
The ceremonies for the Edinburgh Graduations will be held at the Edinburgh Festival Theatre, Nicolson Street.

CONTACT: +44 (0) 131 451 3369 or registry@hw.ac.uk

# past events
## highlights of 2005

### The Malaysian Branch Celebrates the Watt Clubs 150th Anniversary

In the front row, Mrs Archer and Principal John Archer with Malaysian Watt Club patron Tan Sri Dato' Seri (Dr) Yeoh Tiong Lay (centre) next to Datuk Dr Bernard Wang is Dr Bahari and other honoured guests of the Malaysian Watt Club's Graduation Dinner. The celebrations were held in Kuala Lumpur on November 12th to welcome new graduates to the alumni association and mark the 150th Anniversary of The Watt Club.

Datuk Dr Bernard Wang was awarded his Brightest Watts Certificate at the Dinner and Tan Sri Dato' Seri (Dr) Yeoh Tiong Lay and his wife, Puan Sri Datin Seri Tan Kai Yong were awarded a Certificate of Appreciation at the Graduation Ceremony on 13th November for their support for the Watt Club and Heriot-Watt University.

### Toronto Watt Club celebrates 150th Anniversary at the National Club

**6 November 2005**

Dr Bob Gillespie, Chair of the Toronto Watt Club with Co-Chair Doug Harrison and the Toronto Watt Club Committee hosted the Canadian celebrations for 150th Anniversary on November 16th 2005.

The group together with more than 40 fellow alumni and friends began a great night out with cocktails at the National Club followed by a three course menu and a programme that included plenty of networking and the awarding of prizes. For Toronto Watt Club members it was also a chance to celebrate Dr Bob Gillespie's recent selection as one of the 'Brightest Watts' at the University's Gala Anniversary Dinner in October 2005.

Keep in touch with your fellow Toronto Watt Club members through the special website http://torontowattclub.com/

### Hong Kong Reception

**8 November 2005**

The British Council in Hong King was the venue for a meeting of around 30 graduates to attend the second Watt Club reception. The group were able to get together with old class mates and meet fellow Heriot-Watt graduates.

### Hong Kong Alumni Dinner

**9 December 2005**

Following the success of the evening on the 8th


November, the alumni organised an annual dinner which took place on the 9th December. Over 60 alumni and students at Heriot-Watt spent an enjoyable evening together and were joined by Professor Cheung and Professor Li who shared their valuable learning experience with them.

### Shanghai Reception

**3 November 2005**

The first Watt Club reception in Shanghai allowed more than 70 graduates to enjoy an evening together at the British Council. Mrs Mairi Thornton, Director of Corporate Affairs spoke about recent developments at Heriot Watt in Edinburgh and around the world. Rev Howard Taylor was also warmly welcomed by the group. Howard was in Shanghai at the time delivering lectures at the Shanghai University of Finance and Economics and enjoyed meeting up with some familiar faces from the Chaplaincy.

copy too long, can it be cut?

### Watt Club AGM

**27 October 2005**

More than 60 graduates and guests attended this years AGM where they were given a guided tour of the Scottish Parliament before the meeting and enjoyed a chance to catch up at the drinks reception afterwards. At the AGM guests witnessed the handover of presidency of the Watt Club Council from Dales Pearce to Gordon Stuart.

### London Watt Club Spring Event: Tour of the Royal Society

**6 June 2005**

A group of alumni from the London Watt Club enjoyed a most informative tour of The Royal Society on Monday 6 June 2005. The Royal Society is the UK's national academy of science and is at the cutting edge of scientific progress.

### Kenya Watt Club Branch 150th Anniversary Celebration

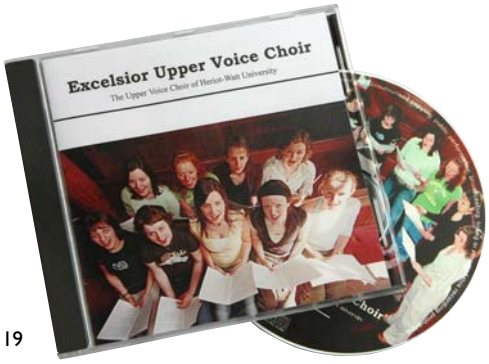
Vishy Talwar, a 1986 BA Business Organisation graduate, is our Ambassador for Kenya. The Kenya Chapter of the Watt Club held a special celebratory event in Nairobi for The Watt Club's 150th Anniversary on Monday, 3 October 2005.

Seen above are the alumni discussing how best to progress Watt Club activities in Kenya and another picture of the cake in University blue to commemorate the occasion (Vishy is on the right with a fellow graduate.)

# the Heriot-Watt GIFT COLLECTION

CONNECTING HERIOT-WATT GRADUATES WORLDWIDE









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|---|---|---|
| 01 | University Tie, Wool | **£10.00** |
| 02 | University Tartan Tie, 100% Silk | **£25.50** |
| 03 | Watt Club Tie, Polyester | **£10.00** |
| 04 | Watt Club Tie, 100% Silk | **£23.50** |
| 05 | University Tartan Bow Tie | **£6.50** |
| 06 | University Tartan Cummerbund | **£27.50** |
| 07 | Heriot-Watt Scarf | **£17.00** |
| 08 | Heriot-Watt China Mug | **£5.50** |
| 09 | University Pen | **£5.50** |
| 10 | Melton Wool Baseball Cap | **£8.00** |
| 11 | University Rugby Shirt (mens/ladies) | **£24.50** |
| 12 | Sweatshirt | **£21.50** |
| 13 | Poloshirt (Heriot-Watt) | **£18.50** |
| 14 | Poloshirt (Oil and Gas Alumni) | **£15.50** |
| 15 | T-shirt | **£10.00** |
| 16 | Hooded Sweatshirt | **£24.00** |
| 17 | Sleeveless Fleece | **£27.50** |
| 18 | 'Heriot-Watt University: An illustrated History' | **£22.50** |
| 19 | CD of 'Excelsior Upper Voice Choir' of Heriot-Watt University | **£5.50** |

| | | |
|---|---|---|
| 20 | Heriot-Watt Brooch<br>Silver Brooch in presentation box.<br>Designed by Clare Goodall, an Edinburgh College of Art Graduate, part of the famous Scottish jewellery company Ortak. | **£39.50** |

**Business Gifts**

| | | |
|---|---|---|
| 21 | Keyring | **£7.00** |
| 22 | Business Card Holder | **£15.00** |
| 23 | University Cufflinks | **£19.50** |
| 24 | Bookmark | **£6.00** |
| 25 | Desktop Set<br>(includes pen holder, business card holder and letter opener) | **£32.00** |
| 26 | Heriot-Watt Whisky Flask | **£32.00** |

**Jewellery**

| | | |
|---|---|---|
| 27 | Heriot-Watt Cufflinks (silver)<br>Also available in 9ct and 18ct Gold | **£39.00** |
| 28 | Heriot-Watt Stick Pin (silver)<br>Also available in 9ct and 18ct Gold | **£20.00** |
| 29 | Heriot-Watt Man's and Woman's Ring<br>Traditional seal ring bearing the University shield available in silver; 9ct, 18ct and 22ct gold and platinum.<br>Prices start from | **£52.00** |

## HOW TO ORDER

**Online**
To place an order online, visit:
www.imagescotland.com/wattclub/

**By phone**
Visit the order hotline on:
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or Fax +44 (0) 131 665 1919

**By post**
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EH21 6EH

For Heriot-Watt branded business gifts through our quality suppliers Ede and Ravenscroft, please visit the online shop at:
www.hw.ac.uk/wattclub/hw_gift_range.html

To place an order for jewellery including high quality rings, cufflinks and stick pins visit:
www.commemorativejewellery.co.uk