Institution: Heriot-Watt University, The School of Textile and Design

Unit of Assessment: 34 Art and Design: History, Practice and Theory

a. Overview

Established in 1883, at the heart of early industrialisation of textile manufacturing in Scotland, the portfolio of today's School of Textiles and Design (SoT&D) continues to evolve and reflect current and future developments in fashion, design, new materials and cutting-edge technologies, consistent with the strategy of Heriot-Watt University (HWU) to conduct world-leading research relevant to business and industry. Today SoT&D has an international reputation as a leading unit for education, research and knowledge exchange with world class facilities, specialist resources and a knowledge base that attract staff and research students from across the world. SoT&D is positioned to influence and advance textile research and innovation by bridging the interface between design and technology. Central to our research philosophy is the conviction that new products emerge from the coalescence of designers exploiting new materials and technologies while engineers benefit from the aesthetic attributes of their creations. These creative and systematic models of approach to design are highly relevant in cultural and social contexts, theory and practice, as applied to creativity and innovation across textiles and design.

Knowledge exchange with local to global industry is maintained through a focus on advanced manufacturing capability and value through innovation. Our extensive network of alumni span a global textile industry. It is from this strong base that SoT&D at HWU has further developed its research portfolio to reflect the opportunities that the design-technology interface offers, transcending the traditional boundaries of textile and clothing manufacture.

During this REF period the School identified an opportunity to restructure with an emphasis on providing support for core areas of strength while developing new collaborations with the University's science and engineering disciplines. The University's 'Global Platform' strategy of recruiting research leaders has been adopted to enrol high potential early career researchers (ECRs) enabling us to broaden our expertise in design, fashion, and materials. We have continued to extend our industry collaborations across the distinct design and technology communities, e.g. Eley Kishimoto, Kim Winser, GoreTex and Unilever and widened our reach through new international networks e.g. the Association of European Textile Universities (AUTEX), ArcInTex (the European design network) and the Materials Knowledge Transfer Network (KTN). We have invested (£453K) in our research infrastructure supporting researchers and PhD students with our research student numbers growing by 25%; providing a dynamic and motivating environment for our research community.

b. Research strategy.

The overarching aim from RAE2008 was to bring design-led research to an international level and to further integrate technological research with design. With increased impetus during this REF period the School has developed its core strategy around building and extending our research community and its cross disciplinary engagement through our central initiatives. These are:

- Developing the School as an international Creative Hub of where design meets technology
- Leading new strategic research collaborations through national and international academic networks and industrial alliances.
- Exploring and exploiting new materials and processes, and play a pivotal role in research and scholarship, innovation and knowledge transfer.
- Implementing an ambitious staffing strategy featuring ECRs across design and technology.

This core strategy takes forward the key strategic developments from RAE2008; highlighted by delivering more than 140 outputs (refereed publications, conferences, patents and exhibitions), undertaking more than 18 research topics and completing 8 major research projects (externally funded to £3M) and supervising 21 PhD students to graduations. Progress on our strategic aims is as follows:

An International Creative Hub: we have established partnerships and networks with bodies such as Creative Scotland, Creative Arts and Business Network, 'ArcInTex' with design schools such as The Swedish School of Textiles and the Royal College of Art and have shown leadership (**Harley**) in the Scottish Academy of Fashion. Interdisciplinary collaborations are evidenced by work such as that of **Christie** and Robertson. New relationships in Bhutan, China and the Indian subcontinent,

achieved through peer recognition, have resulted in collaborative projects funded by the UN, increasing visibility for our international impact and outreach in both practice-led design and contextual studies. These projects take our expertise in the traditional Scottish areas of textiles to new partnerships in creativity. This (with two new United Nations-funded PhD studentships) has opened up new research topics, such as design for sustainable economic development (traditional artisan groups in Sri Lanka, China, and Malaysia) and the production of commercial woven textiles, inspired by Shetland's textiles archives (AHRC Case, Dearlove). Practice-led design research has developed through collaborations such as with Reykjavik School of Visual Arts, in partnership with Northern European Design Schools, supported by the Icelandic Ministry of Education Science and Culture. In support of the interdisciplinary strategy we have appointed 4 ECRs, whose research is informed by practice and contextual studies, (**Jardine**, **Keith**, **le Guennec**).

Strategic collaborations: The School has initiated, led and delivered collaborative projects funded by the TSB, EPSRC, and MOD worth a total of £3.1M. These projects alone involved 22 companies and three UK universities (Leeds, Manchester and Nottingham). Our research, directly funded by industry, spans from characterising the behaviour of fabrics for new product development (Camira Fabrics, Gortex), to prototyping new wearable devices (Mirolink Ltd, healthcare SME, Selex/Es, a major multinational defence company). Beyond the UK, we are a founding member of the Association of Universities for Textiles (Autex, http://autex.ugent.be) and have close research links with other International institutions such as Shinshu (Japan), Clemson (USA), Age (Turkey), Gent (Belgium).

New Materials and Processes, Innovation and Knowledge Transfer: Alongside this, we have continued to grow as a centre of excellence for multidisciplinary textile research at the interface between design and emerging technologies through our Research Institute for Flexible Materials RIFleX. The emphasis has been the integration of design and fashion with technology, as evidenced by the work of **Stylios** with **Wang** and with **Chen**. The Institute has established extensive academic and industry collaborations funded by EPSRC (£650K), TSB (£2.4M), MoD (£70K) and industrial collaborators (£265K). We have sustained significant advances in textile and colour science research, providing designers with access to a range of unique coloured materials, such as photochromic and thermochromic substrates for controlled colour-change through new applications based on digital inkjet printing, and related textile printing technologies. The School is a founding member of the Technical Textiles KTN, (now absorbed by Materials KTN) through Technitex (**Stylios**, Board Member). We are also involved in continuous education activities such as CIMTEC (International Conference on Modern Materials and Technologies) and others in which we take an active role for organising and chairing sections.

An Ambitious Staffing Strategy: The restructuring of our research activity, which we initiated during the REF period with University support and investment in new posts, added depth and breadth to this strategy and enabled us to create two core areas of**, Design (Context and Culture; Archive and Drawing; Fashion for Industry)** and **Textile Technology (Nano Technology; Smart Materials and Garments; Colour and Light),** from the previous three areas, eliminating the boundaries between disciplines, see section c for detail.

In this REF period, our emphasis has been on research at the design and technology intersection. The integration and application of design to the inter-disciplinary textiles base and the creation of practice-led design research enables innovative research and PhD projects , while drawing on science and technology funding sources to strengthen and grow our research community. Our most significant research achievements as related to our future strategy are outlined below.

1. Design (led by **Harley)**

Design has interdisciplinary relationships across the breath of the discipline as well as with technology and focuses on three main areas of **Context and Culture**; **Archive and Drawing**; **Fashion for Industry**. It is actively underpinned by all colleagues in the school. Examples of research explored are: drawing as a visual interpretation from observation and copying in cultural contexts, to drawing for manufacture supported by digital systems **(Schenk);** redesign of products and process to reduce carbon emissions (**Stylios,** Fotheringham) and the re-invigoration of heritage textiles, made suitable for new contexts and a contemporary global market **(Quinn).**

Context and Culture has explored exhibition as a method of practice-based research, including venues such as the National Museum of Iceland in Reykjavik (2011) presenting the relationship of

drawing to textile design (**Harley**, McInnes): **Harley** explores with Eley (of Eley Kishimoto), a range of presentation techniques that focus on design practice, textile innovation and processes being presented at four annual exhibitions (www.eleykishimoto.com/cv). **Le Guennec** explores European children's fashion and the influence of sport clothes in their evolution from the 19th century onwards and used exhibition and presentation of museum collections with fashion prototypes to communicate and disseminate research (Fashion Museum, Calais); **Jardine** used curatorial and narrative approaches to the animation of historical sources to derive contemporary art practice, also presented through the form of exhibition (ICA);

Archive and Drawing: The role of drawing as a visual interpretation in design, has a long established international research profile. The Drawing Research Group (DRG: **Schenk; Harley;** McInnes) established in 2011 to foster research into the contemporary relationship between drawing in traditional and digital forms with textile design. Established research has been extended to explore the role of drawing in ideation and specification for textiles, and the potential impact of drawing on computer-aided knitwear and weave manufacture (**Schenk,** McInnes); papers from the **DRG** have been presented at key international design and specialist textile design research conferences; IASDR2011 (Intern. Assoc of Design Res), and DRN2012. (Drawing Res Net). Intrinsic cultural links between the use of archive material and copying through drawing (**Harley**) were explored through workshops in partnership with Tsinghua University, Beijing.

Fashion and Industry: Central to this has been our leadership **(Harley)** of the Scottish Academy of Fashion (SAF) established in 2009 with Edinburgh College of Art, Robert Gordon University and the Scottish Textiles Industry Association and funded by SFC (£220K). SAF seed funded design projects (with AHRC funding), as well as connecting established technical textiles research expertise (**Stylios, Christie**) through projects with industry. Examples; the DNA of Cashmere, aiming to regenerate guard hair waste into cashmere fibre (**Stylios**; £35K, Todd & Duncan Cashmere) and the Zero Waste Scotland project to redesign products and process to reduce carbon emissions (**Stylios,** Fotheringham; £56K), focusing on the textile and apparel industry. Culture, heritage textiles and context uses unconventional print techniques and production methods for fully-fashioned cashmere garments, working with partners such as Johnstons, Pringle Scotland and Eland International and with additional financial support from Scottish Arts Council, Cultural Enterprise Office, the Scottish Seed Fund and UK Trade and Investment **(Quinn).** Fashion collaboration with archive collections linked to the National Museum of Scotland (Milton, **Harley**: £9K Esmee Fairbairn Trust) was showcased through two public exhibitions at Paxton House in the Scottish Borders. Interdisciplinary research investigates the role of design through contemporary data collection methods, informing design decisions, and collaborators include senior research colleagues from the School of Mathematical & Computer Science returned in UoA11 (Chantler).

2. Textile Technology (led by **Stylios**)

This focuses on **new textiles and processes:** ***Nano Textiles*** investigates the spinning of functionalised nano fibres; the regeneration of cashmere and the scaffolding of stem cells (**Stylios, Sun,** Fotheringham). The School is a leader in the electro-spinning of textile fibres, in 'nano melt spinning' and 'bubble-spinning', and in consequence holds two world patents (W02013/030522) and (WO2013/150258), which deal with conversion of fibres to nano yarns and with the regeneration of cashmere from waste. Low Energy **Wearable Wireless Electronics (Stylios**, Yang) delivers cutting edge research in conductive textiles and organic sensors, integrating technology into fabrics and garments for health (MiroLink), sports and military (Selex/Es) applications. Our research into wireless wearable electronics led to the development of a small and low energy wearable system for wireless electrocardiogram and respiration monitoring, being prototyped commercially for MiroLink. **Pressure Garment Research** (**Macintyre**), has through collaboration with industry and health providers, developed an accurate calibration method for the compression pressure exerted on parts of the body such as legs, improving treatment monitoring. This has applications in medical compression products as well as sports and lingerie design. **Plasma Surface** research techniques (**Sun**) investigate the modification of the surface properties of high performance materials such as Kevlar, with the aim of improving the surface roughness and the weight of **body armour**. This has led to an MOD funded project (**Sun, Stylios**) (£70K) in the 'Design of Body Armour with Improved Ballistic Performance and Flexibility'.

Smart Materials and Garments; the School has developed a 'SmartLab' where research can be

more closely aligned and integrated with the portfolio of textiles, fashion and interior design. Working with fashion designer Yang, **Stylios** has developed a photonic fabric system capable of changing colour by assessing the mood of the wearer. Stylios, working with another designer Chen**,** has pioneered SMART 'Psycho Textiles', which uses brain activity recorded in an electro-encephalogram to develop appropriate photo chromatic fabric patterns to produce dynamic psycho changing textiles. Research by **Sun** in SMART Materials and Garments has given an improved understanding of the heat transfer behaviour of textiles and allowed for the development of functional textile material used for temperature management. Property prediction and simulation of behaviour have also been explored through 2D/3D fabric design and manufacture (**Sun**).

Colour and Light, led by **Christie,** provides designers with access to a range of unique coloured materials such photochromic and thermochromic substrates for controlled colour-change (**Christie;** Robertson). International collaborations on textile design research, using colour and light interactions for novel products, have developed the design and technology interface in this area **(Christie,** Taylor, Forster**).** In recognition of the international importance of environmental issues in design, research funded by Lenzing, Austria, is focused on design-led approaches to sustainable coloration, that are underpinned by scientific evidence, as demonstrated in the impact case study; Unlocking colour chemistry, for safer, greener and faster product and process optimisation. Research collaboration with LCR Hallcrest in the UK has quantified the variable temperature performance of over-layered liquid crystal thermochromic dyes printed on textiles. This research developed a distinctive design research focus, on materials, colour and fashion. These include approaches to computer-aided molecular design, synthesis of new and improved colorant types, pigments and fluorescent dyes, dyes specifically-designed for controlled colour-change (photochromic and thermochromic) and enhanced performance on textiles (Robertson). Contextual research has involved colour and the role of the industrial development of dyes in the fashion industry, as in the case of the award winning 'UWI label' which changes colour as food ages.

c. People, including:

i. Staffing strategy and staff development

Delivery of our research strategy is underpinned by our ambitious staffing strategy. The University's Strategic Plan requires that all staff conduct research and scholarship at an international level and deliver research-informed teaching. Our staffing strategy reflects the University's strategic aim of research intensity and this has moved the School to a greater representation of lecturing staff with allocated research time, as well as to investment in a series of ECR appointments from across the design and technology spectrum. Our research engages in both formal and informal approaches to facilitating ideas and themes to flow across research areas with collaboration actively encouraged. Both formally constituted institutes (e.g. RIFLeX – see above) and informal groups like the **Drawing Research Group (DRG**) nurture team based research and inter-disciplinary partnerships in the wider University and beyond.

Staff development combines opportunities in the University with those arising from School research priorities, and with academic and industry collaborators (see also REF3a). Examples are, the cross-University theme, 'Creativity Design and Innovation' (CDI) and the partnership with HEIs and Industry under the 'Scottish Academy of Fashion' (SAF). Both have provided sandpit events; inter-disciplinary seed-funding (SAF); jointly developed and supervised PhD Studentships (CDI); Industry and Knowledge Exchange projects through the School's Industry Engagement Office (SID); showcase events and exhibitions (SAF). The School is connected to international centres of design and technology such as Kyoto, Cornell, NCSU, Shinshu, Boras, Hong Kong PolyU, Donghua. Funding is provided for conference presentations and participation in research networks.

All staff are encouraged to take part in appropriate courses for their research skills needs through the "Research Futures Programme" delivered by HWU's Centre for Academic Leadership and Development (CALD) with further practical opportunities arising from interaction with academic and industry collaborators, often under the guidance of senior staff (see also REF3a). Staff also have the opportunity to take part in the Scottish Crucible. This is a highly successful, professional and personal national leadership programme, developed initially by NESTA for experienced post-doctoral researchers and those in their first academic position (www.hw.ac.uk/scottishcrucible). It enables researchers across different disciplines to explore their creative capacity and problem-solving potential in new directions. During the three-year probationary period for a new lecturer

time is specifically allocated for engagement with these programmes, and other development activities and is supported by a mentoring system. Reduced teaching loads give new lecturers greater research time, and more formal training is provided through a Postgraduate Certificate in academic practice. Throughout the lecturer's early years there is a mentor system of senior research staff with teaching and administration loads increased gradually to enable independent research. This special commitment to the nurturing of new researchers continues and has led to successful careers, such as Robertson who moved to Dundee University from Heriot Watt. In 2012, the SoT&D has augmented its current programmes of instructional workshops, courses and seminars, ensuring the future health and wellbeing of our discipline by e.g. offering instructional research summer Schools. Heriot-Watt University was amongst the first Universities in the UK to receive and also gain renewal of the "HR Excellence in Research" recognition from the European Commission. This award recognizes the positive actions that the University has taken to support the career development of researchers and the actions in place to implement the principles of the "Concordat to Support the Development of Researchers". ECRs in the School have actively contributed creative ideas and thinking to the wider University future research strategy debate as well as direct expertise and knowledge in current design/technology research. The University holds Athena Swan Institutional Bronze status, that seeks to increase the number of female academics in STEM subjects and its principles are being translated across all disciplines in the University.

It is Heriot-Watt's policy to employ all staff on open ended basis in every appropriate circumstance, with a view to sustaining the longevity of research. Subsequently, teaching loads of research active staff in the SoT&D have been reduced and research time is facilitated through the employment of dedicated teaching fellows. Research in the School is regularly monitored. The Performance and Development Review (PDR) takes place for all staff annually with an interim meeting. Completion of the past years' plan is assessed, and forward job plans and training needs agreed to ensure that researchers have full support for their activities. During the three-year probationary period for a new lecturer time is allocated for engagement with the University's 'Research Futures' programme, the Scottish Crucible (www.hw.ac.uk/scottishcrucible/aims) and other development activities (see above), and is supported by a mentoring system. Reduced teaching loads give new lecturers greater research time, and more formal training is provided through a Postgraduate Certificate

ii Research students

Over the REF period, there has been a 22% increase in externally funded PhD students, 50 hosted PhD students, and 25 successful research degree completions of study (21 PhD and 4 MPhil). International students come from a diverse range of countries (Europe, Middle and Far East, the Americas) all commonly exploiting the design and technology interface in topics such as Mood Changing Garments, Smart fabrics related to brain activity, photochromic dyes for smart fabrics and wearable electronics for health monitoring. Two new UN-funded PhD studentships have opened up new partnerships and research topics, such as design for sustainable economic development (traditional artisan groups in Sri Lanka, China, and Malaysia) and the production of commercial woven textiles, inspired by Shetland's textiles archives (AHRC Case Award).

In parallel to our staff restructuring, we have strengthened the existing programme of support for our PhD Students led by the School's Research Student co-ordinator (currently Dr Danmei Sun). Our students also elect a research student representative (currently Muhammed Oswain Siddiqui). All PHD students have access to the specialist post-graduate programme offered by the University's Centre for Academic Leadership and Development (CALD), which covers all stages of the PHD from planning to thesis production, and can also attend parts of the staff development programme. Although students and staff value learning with colleagues from other schools, we are also planning to bring CALD and other developmental activities to the Borders campus for additional school-specific events. All students have benefitted from the staff investment noted above, the major building refurbishment and equipment investment noted below and also from specific investment in PhD social and design space. The gender balance within the current PhD population of 18 students is 7:11 male: female, with 6 students from the UK/EU and 12 overseas students. International University based employees are funded by their home institution and government agencies including the British Council (6 funded scholarships). UK students have been supported by Research Council funding (3 EPSRC; 3 AHRC) and by Livery Companies such as the Worshipful Company of Dyers and Woolmen, and by industrial sponsorship, for example,

Lenzing (Austria) and James Robinson (UK). The School's PhD programme has also benefitted from University interdisciplinary initiatives linked to cross cutting themes of Environment and Climate Change with jointly supervised students with the Schools of Engineering & Physical Sciences and Management & Languages (2 studentships); and the theme Creativity, Design and Innovation, with jointly supervised students with the Schools of Engineering & Physical Sciences, and Mathematical & Computer Science (2 studentships).

Our research student community benefits from the School's interaction with business and industry e.g. Yang (Selex/Es, MiroLink Ltd); Nasan (Camira Fabrics), Yussef (PIL Membranes, W L Gore Ass., GoreTex), Vadadoria (Todd & Duncan); this activity is supported by the School's Industry Office (SID). PhD students actively co-author journal papers with their supervisors, attend and present at conferences and several have worked within Post-Doctoral teams on funded research projects e.g. Yousef (EPSRC Project (£720K) for the Design and Performance Assessment of Protective Clothing, giving exposure to research development, project management, presentation skills, during meetings with industrial partners. A new development is the opportunity for PhD students to give lectures/presentations to MA and MSC students on their research experience, including how to communicate research and obtain the best outcomes. This will be further developed in the coming year. Our PhD progression and completion rates reflect good practice across the research community and a number of PhD Graduates continue to collaborate with the School in senior roles, examples being Professors located in China at the Yulin University (Han), and Northwestern University (Zhao); Aleppo University, Syria (Bazbooz) and Nottingham University (Lin).The School provides open access support to PhD students from all staff, who provide their expertise over and beyond any formal supervision.

d. Income, infrastructure and facilities

Our total income during this assessment period was £3M in awards and investment in research infrastructure was £453K. The School has built upon its design profile by developing practice-based research to focus on its distinct position as a centre of textiles, heritage and culture. This has been intertwined with the School's well-established international technological research base by integrating with design for commercial and research applications, evident through industrial collaborations, patents and significant government and industry investment.

The research environment is well supported through campus development and equipment. The School benefitted from £32M investment in a shared campus with Borders College. Of the £32M, some was invested in joint facilities such as the Library while £11M was invested specifically in the SoT&D. Dedicated research spaces were designed to meet our strategic research needs, this included laboratories and workshops, testing and presentation facilities, studio and desk research spaces specifically for PhD and ECRs, together creating a vibrant research environment for design and technology research. As an historic building, 'The High Mill' which hosts our School, was re-conceptualised during the REF period with £178K of investment in the upgrading of presentation space and facilities, allowing the re-location of areas of research to be combined. Alongside the investment in space, significant investment in CAD hardware and software (£104K) was spent to provide our staff and students with the latest technologies for research in design, garment, fashion, weaving, knitting and printing. The research environment is further strengthened a rolling programme of updating and training, to continue to support these areas with the most current technologies. The research activity is supported with a team of 11 technical staff supporting our specialist facilities, students and staff. Our strong industry links have resulted in industry partners being extremely generous in their donations of yarns and materials and equipment benefiting the School from in kind donations in the region of £230K. Finally, we have a significant historical collection archive of Textiles.

Research income is significantly higher than the median per FTE member of staff for the UoA and is gained from a variety of sources. Examples are:

UK Government and Research Council Projects: Multi-scale integrated Modelling for High Performance Materials (£1.8M, TSB, TP/5/MAT/6/I/HO558L 2006-2010); Novel Micro Channel Membranes for Controlled Delivery of Biopharmaceuticals (£657K, TSB, TP/4/B1016/I/22246, 2006-2009); Integration of CFD and CAE for Design and Performance Assessment of Protective Clothing (£650K, EPSRC, K3043B, 2007-2010); Design of Body Armour with Improved Ballistic Performance and flexibility. (Dstl/MoD, £70K, 2013); Development of Talent and Innovative

Practice within the Harris Tweed Sector, (£124K, Creative Scotland, 2013-14)
European Research Projects: Digitex; Digital Printing (FW7, of £240K, 2006-2010); Carbon waste in the design and manufacture of textiles, (zero waste Scotland, £56K, 2013).
Industrial Funded Research Contracts: The next generation of Soldier Clothing (£65K, Selex/Es, 2012); Nano, Low Energy Health Monitoring (£200K, Mirolink, on-going).
Joint Commercial Projects: DNA of Cashmere fibre regeneration (£35K Todd & Duncan, 2012); Design and Engineering the Behaviour of the New GoreTex Fabric (£4.2K with additional £15K in–kind equipment, W.L.Gore Ass., Gore Tex, 2013).
Our research is supported with a full line-up of laboratories and workshops which enable us to research anything from fibre, yarn, knit, weave, dye, finish, make-up including whole garments, design and pattern cut manual and automatic, print (screen and digital) fully conditioned measurement and physical testing of textiles to specialised facilities such as chemical synthesis, nanofibre production, scattering SEM, microelectronics/wireless, performance yarn production (melt and wet spinning), filtration. We have a dedicated SMART lab, research studios and a rich archive of Scottish Textile heritance. Dedicated technical staff service these laboratories, support their users and maintain samples of raw materials as well as equipment maintenance.

e. Collaboration or contribution to the discipline or research base

As explained above, SoT&D collaborates widely with both other research-active institutions and with industry. Highlights are:

Design research and collaboration has been driven through leadership of initiatives such as the Scottish Academy of Fashion involving the premier Design Schools in Scotland, and the cross-University theme 'Creativity, Design and Innovation' that has built new interdisciplinary research partnerships. The School has played a leading role in the transformation of the Technical Textiles sector through the TechniTex Faraday Partnership and now TechniTex Ltd (Stylios, Board Director 2006 onwards) and has become part of the Materials Knowledge Transfer Network coordinated by the TSB and the Institute of Physics.(see impact case study).
On a European level, Harley and Stylios are invited core members in the European Architectural / Design network ArcInTex, involving 8 core and 12 associated members from across Europe, including the Swedish School of Textiles and the Royal College of Art. ArcInTex brings architecture together with fabric design and construction. We are also a member of Autex with 31 members from 23 countries working in high level textile education and research. **The School also contributes to both the research base for the discipline and the discipline more broadly as evidenced below, gaining reciprocal benefit as it does so.** Globally, 13 keynote addresses have been delivered in the period. For example:
Keynote lectures: Society of Dyers and Colourists Conference (Mumbai and Coimbatore, India, **Christie**, 2010); Centenary Day of Celebration, (Tianjin Polytechnic University, China, 2012); and presented at 11 other international conferences (**Christie**); Invited by Dstl (Defence Science and Technology Laboratory)**/**MoD, Meeting of the Armour & Protection, 2011 (**Sun**); Papers given at major international design and drawing research conferences; International Association of Societies of Design Research, Drawing Research Network, and European Academy of Design (**Schenk**); 10 keynote lectures at International Conferences (**Stylios**).
Editorships: The International Journal of Clothing Science and Technology **(Stylios,** 25 years Editor-in Chief, Impact Case Study 2). Editorial advisory for 8 organisations and Series Book Editor for Taylor and Francis (**Stylios**). Reviews Editor for Colouration Technology (**Christie**).
Peer Review: Reviewer for the Journal of the Textile Institute, Journal of Textile Science and Engineering, the Medical Engineering and Physics and Burns (**Macintyre**). Assessor of Research Excellence for the Governments of Romania (2012) and Greece (2013) as Chair (**Stylios)**. Reviewer of research grant applications for Hong Kong Grants Council (**Macintyre**); Reviewer of grants for Sweden, Finland, Belgium, Spain, Greece, Hong Kong, Spain **(Stylios)**. EPSRC College Elected Member (**Stylios** 2005-10). Our staff also **share expertise and experience** through visiting Professorships; King Abdulaziz University Saudi Arabia (**Christie**), Chingwa University Beijing (**Harley**) and PhD external examining (**Sun** 1, **Macintyre** 2**, Christie** 7**, Stylios** 12)**.**
Honours received: Gold medal for research excellence, Worshipful Company of Dyers, 2009 (**Christie**); Elected Fellow of the Design Research Society (FDRS) 2011 (**Schenk**); Awarded the Most Cited Article 2005-10 by Journal of Materials Processing Technology **(Sun).**