

Institution: The University of Leeds
Unit of Assessment: 34B DESIGN
<p>a. Context</p> <p>The research in the School of Design is innately multidisciplinary. While it has a mainly technological, industrial and applied focus, it also makes impact within the Visual Communications area and has strong textiles and fashion archiving resources. Beneficiaries of the School of Design's research vary from a broad public (e.g. millions of users of industrial and domestic washing machines, particularly in the developing world) to a more specific user (e.g. chronic pain sufferers in the UK or British school children studying the national curriculum). Professional users include the international textile industry, the UK government and the British Society for Restorative Dentistry. In addition school researchers have been involved in 5 spin-out companies in the period covered by the REF - a prime example of research leading to direct economic impact.</p> <p>The main types of impact relevant to our research are:</p> <ol style="list-style-type: none"> 1. Economic and social impact through technological development and innovation (particularly in the textiles and colour research areas). 2. Social impact through enhancing communication and education. 3. Cultural and social impact through the arts. <p>There are four main research groups in the School:</p> <p>A. Visual Communications includes the consideration of structure, form and performance, product innovation, CAD simulation and visual studies which provides significant cultural impact through networks (eg.Land2 and Spectral Traces) involved in place based practice research. The main impact type is 3 but, to lesser degrees, 1 and 2.</p> <p>B. Colour Imaging, Graphics and Appearance Management includes digital colour imaging, colour theory, the application of colour in textiles, affective/emotional colour, colour management and colour forecasting. The main impact type is 1.</p> <p>C. International Textiles Archiving focuses on ethnographic and historic textiles, with particular emphasis on techniques of production as well as motifs, patterns and other forms of decoration, design geometry and fashion theory. These activities are closely associated with the University of Leeds International Textiles Archive. The main impact type is 2.</p> <p>D. Textile Materials Technology focuses on the design of textile materials and their properties and this research feeds directly into the activities of the other groups. The main impact type is 1 but, to a lesser degree, 2.</p> <p>b. Approach to impact</p> <p>The School's impact agenda is led by the Director of Research and Innovation, who chairs the School Research Committee. The innate multidisciplinary nature of the School enables the identification of new areas of research impact and the formation of research teams from within and between the main research groups. The School's approach can be described using a compass model whereby the main research groups form the cardinal points. Needs/opportunities for design intervention may lie directly within the remit of the cardinal points or may be in the intermediate point directions and thus teams/centres can be formed from members of the main groups to address these societal needs/opportunities. The compass magnet can thus be used to push or pull us towards these directions. (This can be viewed at http://www.design.leeds.ac.uk/research/).</p> <p>The School also works closely with industry and the public services to help ensure that awareness of impact is embedded in the research projects from their inception.</p> <p>There is also a forum for exchange between Research Directors at Faculty level. The Faculty Research and Innovation Committee has representation from the University Innovation team and a standing agenda item on impact-related business.</p> <p>As part of the School's impact strategy, formal mechanisms are in place to externally translate</p>

research outcomes now and in the future. The Clothworkers' Innovation Fund (CIF) is a substantial resource (£400K per annum) available to all staff in the School, via application, to support projects with commercial potential. External business support is provided as part of CIF projects and there is a formal management and monitoring process to support CIF funded projects. Also HEIF funding of £10k per annum has been allocated by the Faculty to support research in technology. The School also employs a dedicated Knowledge Transfer Manager who is actively involved in promoting and disseminating research findings. Mechanisms of delivery include a well-established and comprehensive continuing professional textile education (CPE) programme attracting delegates from national and international industry and commerce.

The following examples show how the School staff and research groups are well placed to react to provide design interventions for societal needs. It will be noted that the three impact case studies submitted to the REF are not given here as examples because, due to our approach, the School has many opportunities to impact on society.

The RITE Group (Reducing the Impact of Textiles on the Environment), co-founded by Blackburn, is a non-profit industry association that provides fact-based advice and information to minimise the negative environmental impact of the production, use and disposal of textiles and apparel. The RITE Group has held an annual international conference and exhibition in London every autumn since 2007. Organised principally by Blackburn, each event has been attended by an average of 300+ delegates. The RITE Group is recognised internationally as a leading independent organisation in the field of sustainability, and is regularly consulted by industry on best practice to achieve greener textile products and processes. Both Houses of the UK Parliament consult with The RITE Group, and several MPs, MEPs and Peers have attended and spoken at RITE Group conferences. Blackburn is one of the three Directors of RITE Group and sits on the Group's board. Research conducted by Blackburn has also been communicated to the public via the media, appearing on Countryfile (BBC1), GCSE Bitesize (BBC2), Kill It Cut It Use It (BBC4), and Women's Hour (BBC Radio 4). His research on sustainable lifecycles is communicated to British schoolchildren through the GCSE syllabus. Blackburn has also co-founded and is a director of two spin-out companies, Keracol Limited and DyeCat Limited. Keracol extracts actives from plants and develops applications of natural extracts in cosmetic products. DyeCat's principal activity is the development of novel polymers and colouration processes to reduce the environmental impact of dyeing and colouration processes.

Stones has been working during the REF period with NHS staff at Imperial College Hospital in London, the Oncology Unit at St James's University Hospital in Leeds, Bradford Teaching Hospitals and Chapel Allerton Hospital in Leeds. Work includes developing graphical ways of showing opioid equivalences for the British Pain Society for use by GPs and clinicians, improving the presentation of leukaemia pathology reports across the North of England, and developing graphic tools to help patients with chronic pain as well as children predisposed to certain forms of cancer. Evaluation with patients and clinicians are used to demonstrate impact in this area.

Laycock collaborated with the prominent English composer Michael Berkeley CBE to produce 'Collision', an exhibition that toured internationally over a four year period. It has reached a wide audience, having been shown at ten venues including the Conservatorio of Bologna, Italy, the Cheltenham International Music Festival, St Mary's Pro-Cathedral, Dublin, and at Art First in London. The project was listed and described in the *Guardian* and *Independent* and a copy of the work is housed in the archive of the Centre for Visual Music, Los Angeles.

The Colour Imaging, Measurement and Appearance Group is led by Professor Stephen Westland. The research has had substantial impact through the contribution made by the group to international standards and to the formation of spin-out companies (such as DigiEye which provides camera-based appearance measurement systems for the textile, food and pharmaceutical industries). Recent research has led to a method of designing contact lenses that can alleviate colour blindness and which is currently being commercialised. Westland was interviewed in the BBC documentary "Race for Colour" in September 2012.

c. Strategy and plans

The School strategy is to ensure that its design activity links creativity with innovation such that tangible benefits and outcomes can be developed that benefit society and culture. Practically, this is achieved by the development of new materials and technologies, design tools and understanding that improve living standards and the value of industrial activity. Using this approach we attract international attention to our work, secure substantial research funding from industry and commerce as well as academic and governmental organisations and receive invitations to participate in national and international forums (e.g. standards committees, trade association committees, international conference organising committees). Based on exciting research outcomes, the strategy has also promoted profitable spin-out activity as a result of either substantial external investment (venture capital) or organic sales growth. Our future strategy will be to maintain and enhance the multidisciplinary activities of the School. These will be at the right level of maturity for the next REF.

The Culture, Society and Innovation Hub (CSI) is the Faculty of Performance Visual Arts and Communications' (PVAC) principal strategic instrument to enhance research quality, volume and impact. Created in 2011 with £1 million internal investment, it is designed to transform institutional research capacity and to have transformative impacts on global issues. CSI coordinates research in the creative and cultural industries across PVAC. Led from the School by Westland, the Hub's Design Lab with the goal of exploring how different facets of design - such as texture, colour and sound - help communicate information or sell products through emotional appeal. The CSI Hub is coupled to the Cultural and Creative Industries (CCI) Exchange, a corporate-level interface with research users, directly linked to research groups across PVAC and Arts Faculties. It funds strategic initiatives and disburses funds to researchers on a competitive basis. A Business Development Manager (BDM) helps deliver the Faculty's research and innovation strategies. The BDM works closely with the PVAC Faculty Research Manager, Pro-Dean for Research and Innovation (PDRI) and Director of Impact and Innovation. The CCI, in particular, will play an important role in developing the impact aspirations of our ECRs by ensuring that colleagues have good access to, and links with the local and national creative sector. The CSI Design Lab will provide a focal point for ECRs and emerging researchers in the School to ensure collaboration, internal and external, to ensure that research has the highest possible impact. The international agenda will be supported by strategic partnerships in the areas of design, textiles and colour at Huazhong University of Science and Technology, Hong Kong Polytechnic University, and Zhejiang University respectively. The School also encourages visiting researchers and professors from overseas to seed international collaborations in the School and to help develop research partnerships and networks.

d. Relationship to case studies

These case studies are evidence of the success of the School's approach to and strategy for impact and are exemplars of how the School's compass model works and of the success of the substantial links that the School has with industry and the public services. The case studies are presented at School Away Days to inform staff and promote discussion. Russell (Design of new nonwoven materials) has been researching the structure and properties of nonwoven fabrics leading to outputs that have enabled him to move into the development of new industrial products and technologies that benefit society. Russell often works with Cassidy from the Visual Communications and Textile Materials Technology groups and Westland and Cheung from the Colour Imaging Group. Hann (Enrichment of public understanding of textile heritages) has researched widely on ethnographic and historic textiles with particular emphasis on motifs, patterns, design geometry and other forms of decoration. He has travelled widely and built up an impressive collection which, added to the existing materials in the Department of Textile Industries (collected since c1880) has enabled the establishment of a world-class archive. This area is also complemented by the conservation science expertise of Carr and the strategies for use of cultural designs of Cassidy. Burkinshaw (Virtually waterless clothes washing) was able, through his research into reducing water and energy requirements in textile dyeing, to spot the environmental and societal improvements that could be achieved by reducing the water requirement in the washing of clothes. Burkinshaw's work (in this case) is in the style of the lone researcher that is accommodated by the compass model approach.