Author(s)	Abstract
Ana Julia Melo Almeida & Maria Cecilia Loschiavo dos Santos *University of São Paolo (USP), Brazil*	**Ways of making and collective project: participation experiment and social engagement on actions addressed to artisanal communities** This paper aims to analyse the importance of the design social role when it is related to productions outside the academic environment, in which the field could dialogue with vernacular knowledge and popular culture. This research seeks to explore how design can enhance and raise the inventive capacity of artisanal communities, through the project Bordados de Passira, how project practice, addressed to the social context, could rethink and balance this relationship, so that it becomes more participatory. The objective of this paper is to discuss the role of the design in collective project actions when working with traditional handicraft communities.
Amanda Briggs-Goode & Nicola Donovan *Nottingham Trent University, UK*	**Case study: Valuing and sustaining Nottingham's industrial lace heritage in partnership with communities** This paper documents the development of a partnership between researchers at NTU and members of the Nottingham lace community. The origins of NTU lie in its establishment as a School of Art and Design in the Mid-19th Century that provided training and skills to workers destined for the East Midland's burgeoning lace industry. NTU is currently the custodian of a 75,000-item lace archive which, along with its original Waverley building represents some of the material, or tangible heritage of Nottingham's lace industry. However, a research team at Nottingham Trent University is engaged with the intangible heritage of Nottingham lace and how these two concepts of heritage intersect for communities associated directly with the industry. Although production generally took place outside of the city, the industry's trading base was in Nottingham itself and its impact on the social, cultural, economic, and physical landscape was significant. The lace industry's decline and eventual collapse in the late 20th Century left communities not only bereft of their livelihood but also their identities as industrial citizens within a cohesive society. In collaboration with members of the public the research team addressed these human aspects of the industry's extinction. Over a period of three years the project brought together former lace workers, their families and other interested parties from the wider community via a series of informal social events, social media networking, relationship development, direct contact and word of mouth. Supported by the research team this group, 'Nottingham P:Lace' became established as a self-supporting social network and independent body dedicated to sustaining the intangible heritage of Nottingham lace. Within the context of a supporting academic framework, this paper discusses the study's collaborative process and presents an analysis of its outcomes. **Keywords**: *collaboration; communities; textile heritage; society; well-being*

Author(s)	Abstract
Pedro Carvalho de Almeida[1], Abhishek Chatterjee[2] & António João Gomes[2] *[1]Research Institute of Design Media and Culture (ID+), University of Porto & Central St Martins University of the Arts, London, University of Aveiro* *[2]University of Porto, Portugal*	## Cortebel 50 in almalaguês This paper presents a collaborative research initiative involving a design approach to Almalaguês, a Portuguese hand-weaving technique possibly dating back to the 11th century. The associated research culminates in 'Cortebel 50', a project that pays homage to the industrial legacy of iconic Portuguese footwear manufacturer, Cortebel, in its 50th year of operation. Its practical component involves exercising tenets of 'Designrascar' in an industrial setting beset with infrastructural and resource-based constraints. It endorses a hands-on approach to design and acknowledges circumstantial constraints as factors that inspire imaginativeness beyond understood thresholds. One partnership has been formed with Associação Heranças do Passado, a non-profit association established to document, preserve and sustain the production of Almalaguês fabric. According to research findings Almalaguês textile faces an uncertain future. It remains largely unacknowledged despite its cultural significance and creative potential, which this project aims to address. Outcomes include production of exclusive 'Cortebel 50' footwear in Almalaguês. Keywords: *Portuguese footwear; Almalaguês weaving; brand archaeology; Designrascar; contextual hybridisation*
Rebecca Earley & Rosie Hornbuckle *Centre for Circular Design, University of the Arts, London, UK*	## A meditation on the faces of circular textile research To achieve a circular textile industry – one that has closed complex resource loops at all stages of the lifecycle – collaboration is required between diverse stakeholders. Working with people from different backgrounds, cultures, training, professions and with different languages can be extremely challenging, and progress when working together for the first time can be slow. This paper presents one approach taken by the authors who used textile design methods to help build a sense of trust and shared understanding amongst a group of EU project collaborators – scientists, designers and industry participants – during six of the mandatory project workshops which took place over a 14-month period towards the beginning of the project. Three experiments were conducted using the faces of the participants to create new insights around the roles, knowledge and expertise of the group; as well as being used to form the basis of the first co-created garment for the project. Keywords: *circular textile research; collaboration; cross-disciplinary and inter-disciplinary approaches; faces*
Elizabeth Gaston *University of Leeds, UK*	## Crafted futures: a craft/technology collaboration Crafted Futures is a craft/technology visual response to William Gott's Dyehouse Pattern Book produced in 1815 whilst Gott was an apprentice in his father's woollen mill. The work utilised craft practice to explore theories of colour contrast, assimilation and optical mixing in colour production. In collaboration with print technologist Muriel Rigout, applied craft thinking was employed in the development of the work, tacit knowledge of materials and skill were employed with formal colour theory, using

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	textile craft processes and digital print as a modelling tool. The project was important as an example of a craft/technology collaboration, identified as a driver for commercial growth. The success of the project was discussed in terms of individual research outcomes, the success of the visual response and the success of the collaborative process. The work was exhibited at Leeds Industrial Museum, Armley Mills, Leeds, 14 October to 27 November 2016. Keywords: *collaboration; craft; digital technology; colour*
Sarah Green *Loughborough University, UK*	**Spinning yarns: textile crafting and emerging dialogues supporting the wellbeing of vulnerable men** This paper discusses an ongoing, practice-based PhD project that seeks to examine the therapeutic use of textile craft processes for vulnerable men's wellbeing. The paper specifically reflects on the main method of research, the community-based textile craft group, ManCraft. The workshops draw on five evidence based categories: Connectedness, Hope, Identity, Meaning, and Empowerment (CHIME), used as a framework by participants during a mind-mapping exercise to explore their individual understandings of wellbeing. The main theme reflected on in this paper is the significance of the emerging dialogues to the therapeutic process, explored further through analysis of an observational journal that recounts participants making and sharing stories with one another. The practice is ongoing so this paper discusses preliminary findings and identifies areas that will be pursued further in the continuing research.
Kevin J. Hunt & Fiona Hamblin *Nottingham Trent University, UK*	**Crafting sensations: exploring textile process through film** This paper explores a series of intersections between theory and practice, film and textiles, making and writing, and between ourselves: a textiles studio tutor and contextual studies tutor. These intersections are part of a three-stage project. Stage one involves an open-ended creative and analytical dialogue to identify common ground and conceptual interests shared between theory/practice. Stage two involves making a film as a collaborative project reflective of our ongoing dialogue. Our intention is to explore sensory and tactile responses communicated through film where the sense of touch/tactility (rather than sight) is engaged as the predominant sense. Stage three involves presenting this film (or films) to our textile design students as an example of integrated theory and practice. Our film (or films) would then become the basis for a studio project exploring design process and conceptual development through film, with a core focus upon texture, tactility and other sensory responses. Keywords: *film; process; tactility; bodiliness; perception*
Anke Jakob[1] & Lesley Collier[2] [1]*Kingston University, UK*	**Sensory enrichment through textiles for people living with dementia** The paper discusses the role of textiles in facilitating sensory enriched environments and meaningful activities for people living with dementia. It is based on recent

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[2]*University of Southampton, UK*	interdisciplinary research, a collaboration between design and healthcare, investigating the provision of multi-sensory experience for people with dementia living in care-homes, particularly the quality and design of Multi-Sensory Environments (MSEs). Results from an ethnographic study conducted in 16 UK care-homes revealed that set-up and design of existing MSEs were often not appropriate and suitable for older people, and facilitation of multi-sensory activities by staff was poor. The absence of textiles and its appropriate use was noticeable, although the multi-sensory qualities intrinsic to textiles offer many benefits. Based on these findings, design criteria improving usability and accessibility for older people with dementia were established and user-centred design recommendations developed, including the use of textiles as an essential aspect. Keywords: *dementia care, well-being, interdisciplinary, sensory*
Geoffrey Diego Litherland & Angharad McLaren *Nottingham Trent University, UK*	**Woven within the surface: interconnected explorations of fine art linen canvas production** For centuries, linen canvas has been the preferred fabric support for painters. While there are historical examples of decoratively woven canvasses, the aesthetic relationship between canvas and painting has rarely been explored. Previously a cottage industry in the UK, production of linen is now mechanised on an industrial scale. Lost skills required to process the fibre are being re-contextualised by designers and craftspeople for the sustainability value of slow, local production methods. Similar principles are evident in the work of contemporary artists exploring ecological themes through use of nature as raw material. This paper describes the early stages of Woven Within the Surface, a collaborative interdisciplinary project to grow and weave patterned linen canvas, exploring interconnected aesthetic, ecological, and material-led concepts in textile design and fine art contexts. Discussion will focus on the benefits of collaborating across disciplines in relation to development of new knowledge and understanding, skills, and creative outcomes. Keywords: *linen; weave; painting; collaboration; interconnectivity*
Janette Matthews[1] & Nithikul Nimkulrat[2] [1]*Loughborough University, UK* [2]*Estonian Academy of the Arts, Estonia*	**Intertwined: cross-disciplinary collaboration utilising mathematical techniques for knotted textile design** Cross-disciplinary collaboration may ask questions, reveal hidden insights, generate new knowledge and inspire design. This paper discusses a practice-based research collaboration between two disciplines – mathematics and textile practice. In the case study which is described, knots are central to an ongoing collaboration between a textile practitioner-mathematician (Matthews) and a textile practitioner-researcher (Nimkulrat). Two aspects of century-old mathematical diagramming techniques originating in mathematical knot theory are used to analyse contemporary textile knot practice. Informed by new insights, these diagrams may be manipulated and used as a design tool to generate and visualise new patterns and structures for knotted textiles

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	and to inspire the use of new materials. Through the case-study, the paper will discuss the nature and the role of cross-disciplinary collaboration for textile design – the process, the dialogue, the opportunities, the challenges and the exchange of new knowledge. Keywords: *collaboration; textile design; knots; knot theory; textile research*
Alison Mayne *Sheffield Hallam University, UK*	**Making myself well: Participant collaboration in 'woolly wellbeing reflection boxes'** This paper explores the ways in which common threads in the praxis of making quietly at home can be uncovered through 'Reflection Boxes' – filled with yarn, hand-crafted stationery and suggestions for activity – as a means through which participants can tell their own stories about wellbeing and crafting with knit, crochet or weaving. The boxes represent an invitation rather than a probe, providing an opportunity for collaboration where participants can engage with research in the manner of their own choosing. Participant responses offer perspectives on the individual creative processes of amateur craftswomen, considering activity in making which is frequently undertaken alone in domestic spaces and 'hidden' from the academy. Findings contribute to understanding about how participants are making with yarn as a way of expressing personhood and managing their subjective wellbeing, in addition to revealing how collaboration in research has been an enriching experience. Keywords: *wellbeing; amateur making; yarncraft; participation*
Angharad McLaren[1], Frances Stevenson[2] & Louise Valentine[2] [1]*Nottingham Trent University, UK* [2]*University of Dundee, UK*	**Collaborative user-centred textile design research for healthcare: improving wellbeing and increasing performance** It has been widely acknowledged that collaboration across disciplines is required in order to develop innovative, sustainable textile solutions that address complex societal problems (Kane & Philpott, 2013; Igoe, 2010). Potential to develop life-changing innovations in the field of advanced textiles for medical and healthcare has been identified as a key growth sector within Scotland, with collaborative cross-disciplinary user-focused design approaches recognised as central to developing new concepts that address human needs (Malins et al. 2012). This paper describes three feasibility studies undertaken by the Textiles programme at the University of Dundee between 2012 – 2014; collaborative design-led research projects that supported local medical and healthcare companies by providing key expertise in textile design, functional clothing design methodologies and user-centred processes for design-led innovation. Analysis and discussion focuses on understanding the challenges and benefits of collaborative research between academia and local enterprise to textile design innovation, local economy, society, and education. Keywords: *innovation, medical, wellbeing, user-centred design, economy*

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Laura Morgan *Loughborough University, UK*	**Interdisciplinary textile design research for material innovation: synthesising design, science and industry collaboration** Within the landscape of contemporary textile design research lies a rich site for collaboration, with the opportunity to draw on specialist knowledge across disciplines. This paper argues that Integrating textile design practice with specialist scientific and technical knowledge allows designers to engage fully with new processes, and develop new approaches to textile design to drive innovation in the field. The paper reflects on the interdisciplinary and collaborative elements of a research study examining laser technology for textile design. An interdisciplinary textile design research methodology is described, encompassing industrial and interdepartmental collaboration. Defining a specific strategy for the research was characterised by a fusion of science, design and craft practices. The interdisciplinary approach borrowed from action research principles, with design specific skills identified as key to advancing the study, together with the systematic rigor of controlled experimentation. Industrial input from the project's industry partners provided commercial validation leading to the development of four Laser Textile Design techniques for coloration and three-dimensional moulding of materials that offered environmental sustainability thorough resource efficiency and digital processing agility.
Helen Paine[1], Kate Goldsworthy[2] & C. Sharon Baurley[3] [1]*University of the Arts, London; Norwich University of the Arts* [2]*University of the Arts, London* [3]*Zurich University of the Arts (ZHdK), Royal College of Art*	**Evolutionary approach of a textile designer through cross-disciplinary research practice: a case study in the field of advanced methods for joining textiles** This paper will discuss the evolving methodological approach of Helen Paine who has a background in knitted textiles for fashion and completed her cross-disciplinary PhD at RCA in 2016. The PhD was sponsored by TWI: an engineering institution that specialise in materials joining and partnered with Speedo International to develop capability in the field of advanced methods for joining textiles. A multi-strategy framework that encompassed both craft-design and scientific methods was applied by the research to investigate new opportunities for ultrasonic and laser welding technologies. Specific insights relating to how and when either a craft-design or scientific approach was applied throughout the research trajectory will be discussed with the aim of contributing to an emerging methodology for textile-designers engaging in cross-disciplinary research practice. **Keywords**: *cross-disciplinary practice; craft innovation; material futures; emerging technologies*
Gina Pierce *The Cass, London Metropolitan University, UK*	**The fabric of the city, archive textiles inspire a collaborative project in contemporary design and innovation** The 'Fabric of the City', a collaborative group project supported by Arts Council England funding, was initiated in order to further understand the impact of the 'archive' on

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	textile practice. The project ran during 2015, culminating in an Exhibition and Symposium. The response was framed by the requirements and restrictions of the situation created by the archive conditions and reproduction limitations, leading participants to challenge their normal modes of practice. Sharing the reflection on the outcomes of the work is a step in the building blocks necessary to develop our thought processes, within the security of the collaborative practitioner group. From immersive archive sessions through to group consultation, the supportive environment engendered outcomes which have left a legacy on creativity and innovation in new products. These can be seen in the impact on developments in commercial applications, in addition to theory, in product and textile design. Keywords: *archive; collaborative; innovation; immersive; reflective*
Jane Scott & Elizabeth Gaston *The University of Leeds, UK*	**Inflection: assembling interdisciplinary material knowledge using knitted fabric construction** Inflection is the outcome of interdisciplinary research working across knit design and historic archives held at The Royal Armouries, Leeds. The aim of the research was to develop new knitting techniques using CNC knit technologies through analysis of the functional and performative properties of historic Chinese arms and armour. The methodology applied the concept of the artefact as a means to communicate thinking across disciplines between knit design researchers and historians. Using specific pieces from the collection, research investigated the lacing structures of lamellar armour and the assembled composition of composite bows as methods to achieve complex form in knit at an architectural scale. Key findings evaluate the use of artefacts and prototypes as tools for interdisciplinary collaborative research. In addition the research presents a new material system for knit where the rigid and the flexible are recurved within a knitted assembly creating new large scale geometries.
Lisa Shawgi *Nottingham Trent University, UK*	**Supporting sufferers with a 'hidden disability' through textile developments** Raynaud's, Rheumatoid Arthritis and Diabetes sufferers experience a ‘hidden disability’. Symptoms include painfully cold extremities and aching joints that affect their everyday activities. Through a user-centred design project, my MA laid the foundation for my current PhD work by researching the somatic needs and sensorial wants of a Raynaud’s sufferer. This paper discusses how the groundwork laid by the MA has helped to form and develop a methodology for the PhD, a participatory action research project. Which so far has identified a theoretical framework through a literature review, to question and challenge conventional priorities when designing for a person's physical and subjective well-being. By linking creative and aesthetic approaches with advanced textile technology, the methodology will build on and test work that asserts the importance of aesthetics to create and maintain a sense of ‘self’ for the wearer, underpinned with the aim of exploring opportunities to use textile development to help sufferers 'self-manage' symptoms. Keywords: *well-being; knitwear; Raynaud’s; user-centred; participatory design*

Author(s)	Abstract
Julia Cassim[1], Anne Toomey[2] & John McNair[1] [1]*KYOTO D-Lab, Kyoto Institute of Technology* [2]*Royal College of Art*	**S++: a hybrid textile for healthcare and well-being contexts** This paper presents a collaborative, design-led research project between KYOTO Design Lab (D-Lab), the Department of Advanced Fibro Science, Kyoto Institute of Technology (KIT) and the Royal College of Art's Textiles Programme (RCA). The project involved an initial one-week workshop, followed by a 6-month design research associateship at KIT's D-Lab – an innovation incubator delivered through practical design methodologies and interdisciplinary collaboration. The focus of this project was to investigate the possibility of re-engineering chirimen, a traditional 'intelligent' silk crepe fabric being woven in the Tango Peninsula, in northern Kyoto Prefecture. Varying the weave structure itself and introducing PTT, a thermoplastic polymer, enabled the creation of a hybrid textile of silk which is hydrophilic and Polytrimethylene terephthalate (PTT) which is hydrophobic. This hybrid textiles structure offers new product applications for chirimen silk in healthcare contexts against a background of industry decline and shrinking markets for this highly sophisticated textile. **Keywords**: *collaborative research; inclusive design; hybrid textile; chirimen silk; healthcare*
Katherine Townsend[1], Ania Sadkowska[2], Juliana Sissons, Karen Harrigan[1] & Katherine West[1] [1]*Nottingham Trent University, UK* [2]*Coventry University, UK*	**Textiles as a catalyst in the co-creative design process** This paper presents findings relating to the crucial role of textiles in the Emotional Fit (Townsend et al. 2016) collaborative research project, which is investigating a person-centred, sustainable approach to fashion for an ageing demographic. Working with a group of Nottingham women (aged 55+) the team have accrued and responded to data drawn from in-depth interviews, wardrobe inventories and body measurements, to develop a collection of co-designed fashion prototypes that aim to meet the physical and emotional needs of their participants. By integrating geometric cutting with carefully selected and bespoke printed textiles, the resulting minimal waste garments enable wearers to express themselves via universal silhouettes incorporating multiple styling options, in support of personal agency and product longevity. Textiles act as the catalyst for the design and project development process by: providing a starting point for shape making through draping on the body and mannequin; as sensorial substrates to elicit tactile responses and interactions; as the surface for photographic imagery, engineered patterns and contrasting volumes, to be enacted by the human form. The project demonstrates how such a co-creative or hacking approach necessitates a shift away from the established hierarchical fashion system (Busch 2009) that often undervalues its consumers. Here, by contrast, we actively explore the potential customer's lived experience of the relationship between body, cloth and dress to inform a more holistic fashion design philosophy. The methodology challenges the generally accepted view of the textiles as subordinate to the practice of fashion, by documenting normally unspoken exchanges with the semantics of fabric through handling, manipulation, testing, printing, toiling and constructing. By reflecting on the

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	aesthetics of cloth in relation to the emotional fit of clothing, we illustrate how it is intrinsic within the creative decision-making process, whereby embodied associations with the past point towards newly imagined wearable futures. Keywords: *emotional fit; co-creation; body-cloth interaction; fashioning textiles; in-between garments*
Riikka Townsend[1], Antti J. Karttunen[1], Maarit Karppinen[1] & Jussi Mikkonen[1] [1]*Aalto University, School of Art, Design and Architecture, Finland* [2]*Aalto University School of Chemical Engineering, Chemistry and Materials Science, Finland*	The cross-section of a multi-disciplinary project in view of textile design We describe the development path of a smart textile-design method, stemming from a collaborative multi-disciplinary project, with three university departments: chemistry, design and electrical engineering. While the project focus was not originally on textiles, the needs for flexible semiconducting materials led to experiments with a zinc oxide(ZnO) semiconductor deposited over cotton substrate, thus shifting the focus towards textiles. A series of exchanges and actions between the three disciplines, raised the awareness of the need for textile-design methods regarding electric materials. Taking this as a starting point for generating new knowledge, drawing from the strengths of both textile design and engineering, an approach to develop smart textiles was developed. In this paper, we discuss the overall project, and identify the key stages in the interdisciplinary collaboration, in terms of textile design practice, while reflecting on the outcomes, which enabled paving the way for interwoven design and scientific knowledge embedded into smart textile design practice. Keywords: *smart textile; process; interdisciplinary research; ZnO yarn*
Samantha Vettese *Edinburgh Napier University, UK*	3D printable recycled textiles: material innovation and a resurrection of the forgotten 'shoddy' industry This paper will disseminate an interdisciplinary project, undertaken at Edinburgh Napier University between the Design and Advanced Materials. Several 3D printable materials are commercially available that use recycled material, but none that incorporate textiles. This project was funded by the Textiles Future Forum in collaboration with four Scottish textile companies who provided 'waste' textiles (wool, cashmere and leather), to be used in this way. In the cases of the wool and cashmere, this is predominantly selvedge waste from the looms and knitting machines. The leather was recycled from airplane seats. The paper will outline the historical context of the project, particularly the advent of 'shoddy', how these historical processes have common characteristics with the procedures used in this project, a brief outline of how the 3D printable materials were created and an evaluation of the embodiment of the narrative of Scottish tradition and 'authenticity' in the materials. Keywords: *3D printing; waste; shoddy; authenticity; Scottish heritage*

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Sarah Walker & Anna Pipe *Nottingham Trent University, UK*	**The textile designer 2.0: a workshop guide for future workshop facilitators in eTextiles** This paper reports upon an interdisciplinary workshop called 'Designing with eTextiles' led by a team of facilitators with backgrounds in woven and multimedia textile design, and textile engineering. The aim of the workshop was to support participants in multidisciplinary groups to develop smart textile concepts using electronic textiles (eTextiles). The paper discusses the roles of the facilitators, the workshop delivery including the hands-on activities designed to stimulate co-design thinking. The workshop outcomes illustrate the different results created from the workshop groups and their future applications. The reflections on behalf of the two textile design facilitators are analysed to discuss the transition from practitioner to facilitator. Final recommendations for future workshops suggest the need for facilitators to become co-researchers to support interdisciplinary design approaches to envisaging future possibilities of eTextiles within the market sectors of fashion, interiors architecture and healthcare.
Verena Ziegler[1] & Oliver Fritz[2] [1]*Zurich University of the Arts* [2]*Constance University of Applied Sciences*	**InBetween: material encounters in human/non-human interactions** InBetween is a collaborative interdisciplinary PhD research project situated at the intersection of architecture, textile design, and interaction design. The project explores sustainable forms of future life and seeks to identify bionic principles so as to create alternative lightweight building structures using textiles and digital fabrication techniques. This paper adopts a "designerly" (Cross 1982) approach and collaborates with various experts in three different settings at the Open Innovation Lab (OIL). It constitutes a piece of hybrid research in that it combines an alchemical "Wunderkammer" (curiosity cabinet) (Leibniz 1600; Munster 2006), i.e., "the old science of struggling with materials, and not quite understanding what is happening" (Elkins 2000, p. 17), with modern forms of collaborative investigation and with tool-making from science laboratories. This paper addresses the potential for holistic experimentation in interdisciplinary collaborations based on embodied experiences and ideas. These come into existence through – rather than are excluded from – an aesthetic engagement with emerging material technologies and with materials research for designerly application. Such serendipity in interdisciplinary collaborations opens up a space beyond disciplinary framings, where researchers can step back from purely disciplinary methods and perspectives and engage in a collaborative space of future possibilities. Keywords: *emerging material technologies; interdisciplinary collaborations; embodied engagement; epistemic action; serendipitous discoveries*