

INTERSECTIONS EXHIBITION

Collaborations in Textile Design Research Loughborough University London 13 - 14 September 2017



We are delighted to exhibit an international selection of responses to the theme of collaboration in textile design research. The exhibition showcases the work of over 30 collaborations from leading designers, practitioners, artists, artisans, academics, scientists and engineers.

Through these bodies of work, we invite the audience to examine the diverse role collaboration plays in contemporary textile design research, influencing and informing material, process and social innovation; and providing a wealth of aesthetic, functional and conceptual material outcomes.

Dr. Laura Morgan

INTERSECTIONS

Collaborations in Textile Design Research Exhibition

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textileintersections

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Electronic yarns

Advanced Textiles Research Group

The work presents the patented Electronic yarns (Patent W02016/038342 A1 electronically functional yarns) and prototype products made with electronic yarn. Showcased prototypes and samples include Vibration-sensing glove, a Temperature-sensing sock and stretch fabric for a carnival costume with attached electronic yarns

Role of Collaboration: The project is a collaboration between the Advanced Textiles Research Group at Nottingham Trent University and the Department of Electronics and Computer Science at the University of Southampton. Industry partners are included as part of an advisory board. This ensures that the electronic yarns are developed in line with the requirements of industry. Additional partnership projects enable further collaboration with those interested testing

electronic yarns or using them within their own designs. One example is a collaboration with a local dance school to make a carnival costume containing LED yarns.

Artist Bio: The Advanced Textiles Research Group (ATRG), formed by Professor Tilak Dias in 2010, is a thriving research group at Nottingham Trent University, with a global reputation for designing electronically active wearable technology. The group has invented electronic yarn. This is textile yarn that contains electronic components. These include



sensors, actuators and microcontrollers in ultra-thin dye form. Automation of production of the yarns is being developed. The yarns can be incorporated within knitted, woven or embroidered structures. The structures maintain their drapability and flexibility. The project is funded by the Engineering and Physical Sciences Research Council.

Digital Laser Dyed Textiles

Kerri Akiwowo

This research has identified the capability and potential of laser technology as both a creative and a manufacturing device. The Digital Laser Dye process proposes an alternative coloration and patterning tool for synthetic fibres compared to traditional and conventional textile printing and dyeing methods. Instead, digital laser-dyeing utilised laser beam energy as an image creation tool to modify surface fibres with high-resolution, engineered patterns and dyed surface effects. The process enables and promotes design innovation; design flexibility; enhanced textile finishing and customisation possibilities; and on demand processing in terms of: pre-laser modified fabric or apparel; and post-construction dye-on-demand finishing for textiles and whole/complex garments.

Role of Collaboration: The project was an Arts and Humanities Research Council (AHRC) Collaborative Doctoral Award (2010-2013) and an interdisciplinary study between Loughborough University (School of the Arts, English and Drama; Wolfson School of Mechanical, Electrical and Manufacturing Engineering; Chemistry, School of Science; and industry partner the Society of Dyers and Colourists, UK. This collaborative framework facilitated the qualitative and quantitative aspects of the experimental study. Experimental methods and procedures were rigorous leading to reliable, industry relevant results explored from a textile design perspective.



Interlooped

Mark Beecroft

Digits 2 Widget's unusual openness to discuss and develop ideas enabled this project to develop apace. Their unparalleled experience in the development of challenging applications of 3D Printing and Additive manufacturing also enabled informed decisions to be made about what would and would not work. Most importantly, they were willing to investigate what MIGHT work. Their commitment to producing Nylon SLS at its optimum quality was another key factor when exploring the boundaries of the technology's capabilities. The development of this project required highly skilled parametric CAD work so Digits 2 Widgets' designer Tom Mallinson was employed to help digitally model the interlooping structures.

Role of Collaboration: Interlooped is a body of practice based research which takes the four primary structures of knit as the starting point to develop a body of 3D printed textile based structures. 3D printing is an emergent technology which when combined with established textile processes offers the opportunity for a new method of textile production. By emulating the structures of knit using 3D Computer Aided Design it is possible to 3D print textile based structures which embed knit's inherent properties, of stretch and flexibility, whilst exploiting the mechanical properties of the material used to print with.

Artist Bio: Mark Beecroft is a senior lecturer in Textiles in Practice at the Manchester School of Art. As part of the Design Research Group his research lies at the intersection of textiles innovation and new materiality. Mark has recently enrolled on practice based PhD entitled Interlooped: an investigation into how the primary structures of knit can inform and enhance the materialisation of 3D printed textile structures.



Unfoldingthinking

Les Bicknell

A residence at The Nano Doctorial Training Center in Cambridge University recognised similarities between art and science, explored possible confluence and has developed conceptual connections.

The specific materiality of the laboratory makes one conscious of the body. I documented the subconscious hand gestures made by scientists as they communicated scientific concepts and laboratory processes. Subsequently, I constructed physical objects that revealed and contained the movements made with the hand. This observation and body of work has instigated conversation and debate; raising consciousness amongst scientists



around the idea of presence and communication through making, manifesting physical something that cannot be seen alongside the role of haptic thought.

Role of Collaboration: The project was an Arts and Humanities Research Council (AHRC) Collaborative Doctoral Award (2010-2013) and an interdisciplinary study between Loughborough University (School of the Arts, English and Drama; Wolfson School of Mechanical, Electrical and Manufacturing Engineering; Chemistry, School of Science; and industry partner the Society of Dyers and Colourists, UK. This collaborative framework facilitated the qualitative and quantitative aspects of the experimental study. Experimental methods and procedures were rigorous leading to reliable, industry relevant results explored from a textile design perspective.

Artist Bio: Artist, maker and educator, specialising in the creation and exploration of artists bookworks and associated processes. Alongside an extensive and diverse history of community engagement in a wide ranging number of situations Les has held a range of academic post, presently he is Senior Lecturer on the BA Textile Design Course at NUA, Course Tutor at Camberwell College of the Arts on the MA Book Art Course and Visiting Tutor on the Fine Art MA for the OCA. His work has been exhibited and collected internationally including The Rijksmuseum, The V&A Museum, M.O.M.A. New York, The Tate Gallery.

Cortebel 50 in Almalaguês

Pedro Carvalho de Almeida, Abhishek Chatterjee, António João Gomes



Almalaguês is a traditional handweaving craft from Coimbra, Portugal, possibly dating back to the 11th century. This knowledge has been kept alive through many generations of weavers. However, Almalaguês textile faces an uncertain future, and still remains largely unacknowledged despite its cultural significance and creative potential.

The material presented introduces a collaborative research initiative that seeks to address issues regarding its relevance and sustainability, by exploring a completely new segment of application – footwear. Outcomes include the production of an exclusive series of `Cortebel 50 in Almalaguês', in collaboration with local weavers from Almalaguês, and Cortebel – an iconic Portuguese footwear manufacturer in its 50th year of operation.

Role of Collaboration: The work presents a collaborative research initiative involving a design approach to Almalaguês, a Portuguese hand-weaving craft possibly dating back to the 11th century. Different

entities such as the community of weavers represented by a local association, industrial workers and partners, the Portuguese Council for Arts and Crafts, and administrative authorities were engaged by the artists – who are also designers and academics – to make this initiative possible. From this collaboration emerged a network which can potentially sustain and promote this vulnerable craft.

Artist Bio: Dr. Pedro Carvalho de Almeida is a communication designer, Assistant Professor of Design at the University of Aveiro, Portugal, and post-doctoral researcher at the Research Institute of Design Media and Culture (ID+), and Central Saint Martins, UAL (funded by FCT); Abhishek Chatterjee and António João Gomes are PhD candidates in design at the University of Porto, Portugal.

S++ hybrid silk textile for healthcare scenarios

Julia Cassim

Chirimen is the generic name for a silk kimono fabric in which right-laid and left-laid hard-twist yarn is alternately woven to create the weft. It is classified by the difference in yarn twist, fabric construction and the stretch and textural qualities of the processed chirimen. Once the sericin has been removed, the silk fabric shrinks by a third and is recalibrated, resulting in a stretchy textured crepe surface. This principle of construction based on the differential between the right and left twist of the weft yarn and the fact that silk is hydrophilic opened up possibilities of creating a hybrid textile of silk and PTT, a sustainable bio-plastic more suited to new healthcare scenarios.

Role of Collaboration: S++ was a research-based design project led by D-Lab in collaboration with the RCA, traditional chirimen weavers, textile researchers and Dupont in which a traditional kimono fabric was re-engineered with bio-plastics to enable it to embrace new healthcare scenarios. As a result it involved parties from all related sectors.



Garments for Uncomfortable Social Situations

Sasha de Koninck

Garments for Uncomfortable Social Situations (GUSS) is a series of knitwear designed to be manipulated when the wearer is anxious. Knitwear allows for seamless integration of the sensor and seamless transition from conductive yarn to regular yarn.

GUSS uses Galvanic Skin Response to generate a sound personal to the wearer. Galvanic Skin Response is a change in the electrical resistance of the skin caused by emotional stress. When

sweaty skin manipulates the sweater, it responds. The sound is there for several purposes. It can calm the wearer or alert those around them. Each garment is designed with a specific tactile experience for the wearer.

Role of Collaboration: This project was created in collaboration with the TextielLab in Tilburg, The Netherlands. I worked with a technician to come up with the most suitable knit structures to get the sensor effect I wanted. It was her structure knowledge, and my sensor knowledge that came together to make this project possible. As well as the access to industrial machines that the TextielLab provides.

Artist Bio: Sasha de Koninck is an artist and researcher from Santa Monica, CA. She graduated from the Maryland Institute College of Art in 2013 with a BFA in fibers, a minor in creative writing and a concentration in sound art. The next leg of her journey led her to the Windy City, where she graduated from the School of the Art Institute of Chicago with an MFA in fiber and material studies. She currently teaches Conceptual Clothing and Sculpture at New Roads School.



EVINCE

Paridhi Diwan

EVINCE – "Dress to Express"

Whether we like it or not, our Digital selves have become our "Second Skin", competing with the already existing layer of expression - our clothes.

Probably, we walk with two skins now; one defined by our Virtual Self, the other defined by our Clothes. What if these two external expressions were linked? What if your clothes reflected your current emotional state in real-time; through your



actions on social media? What if you evinced your state-of-mind as you walk the talk? The project explores the design of garments that can change their form in response to emotions expressed online on social media platforms.

Role of Collaboration: The garment 'collaborates' with the wearer's social media account. The emotion of the wearer is identified based on online data. The garment changes its form to represent the identified emotion. Nitinol actuators (shape memory wires) help bring about the physical transformation in the garment which are controlled using an Arduino. Currently the garment is mapped to respond to 3 emotions.

Artist Bio: Paridhi Diwan is a student of "New Media Design" at the National Institute of Design, India & a "Fashion & Apparel Design" graduate from the National Institute of Fashion Technology, Mumbai, India.

Her work experience encompasses a broad range of disciplines from designing smart textiles and wearables, to multi-platform user experiences for digital products and services, to creating products and interfaces, graphic designing, branding and marketing, designing garments and accessories, to creating animations. With a keen focus on user interaction and experience design, she aims to simplify seemingly complex tasks through thoughtful information architecture & unified visual experiences in modern software applications.

Silence Shirt

Rebecca Earley

Silence Shirt is the 17th collection from the Top 100 project (www.upcyclingtextiles.net) and explores the contribution silent meditation and portraiture can make to developing relationships between inter-disciplinary partners in a design science EU project, www. trash2cashproject.eu. Building on previous collaborations that explore the multiple human aspects of textiles for the circular economy (Shanghai Shirts, Shavasana Shirts, School Shirts) this collection focuses on the relationships between material scientists and industry designers. Trash-2-Cash is a project with 18 partners from 10 countries - language and expertise levels can be barriers to successful outcomes. This experiment sought to create a baseline experience from which the first co-created piece could be made.



Role of Collaboration: This has been the most difficult of all the shirts in my Top 100 project. The images were created through a silent meditation and portrait session between scientists and designers in the Trash-2-Cash project. I wanted to facilitate the making of a co-created garment for the project, to bring people from different backgrounds, cultures and disciplines together in to one focused task. I wanted to find a common ground for us all – and to give us a chance to connect in a less formal way. After we had made the portraits I found it difficult to make a unified design – the drawing styles differed so much. But the end result is a shirt that represents the effort required to make collaborative projects work – especially between designers and scientists – and I got the print design to work by extending the lines between portraits and literally linking people up.

Artist Bio: Trained as a printed textile designer (BA Hons, Loughborough, 1992) and fashion print designer (MA, Central Saint Martins, 1994), Becky set up the B.Earley studio in 1995. Becky is now an award-winning design researcher and Professor of Sustainable Fashion Textile Design at University of the Arts London. She divides her working life between Chelsea where she is Co-Director of the Centre for Circular Design (CCD) and Sweden where she is key part of the research consortium work for MISTRA Future Fashion and the EU Horizon 20202 project, Trash-2-Cash. She is also a judge for the Global Change Award, (H&M Foundation). In 2014 her team at Chelsea was awarded The Textile Institute Sustainability prize. Becky has been upcycling polyester shirts through her 'Top 100' work for almost 20 years, as a practice method for exploring sustainable design approaches.



Silent Soundwaves and Sutured Statements

Paula Gamble-Schwarz, Bryony King

In Sutured Statements, Paula has interpreted random daily conversations with Bryony by hand rendering appropriate symbols. Bryony has then converted each symbol into digital format, and embroidered them onto paper. The outcome is a body of work which denotes a conversation in a simple and pared back form.

Silent Soundwaves visualises a soundwave from a specific statement, rendered into a graphical format. The soundwave has been digitally embroidered onto a surgical mask using thread and liquid crystal thermochromic ink. The surgical mask covers the mouth, denying the viewer the ability to lip-read, whilst the format of its display denies the viewer access to the sound of the subject's voice. Only the presence of heat, from the subject's breath suggests that the statement has been spoken, and has, in fact, existed at all.

Role of Collaboration: Without the collaboration of the two parties, this body of work would fail to exist. Bryony King is currently exploring the possibilities of using digital embroidery in potentially unexpected circumstances. Paula Gamble-Schwarz is interested in exploring the use of symbols to convey narrative. They have come together to convey their concept through this process.

Artist Bio: Paula Gamble-Schwarz is the Art & Design Foundation Programme Director at Loughborough University. Her background is in Multi-Media Textiles. Paula is currently involved in a collaborative relationship with Bryony King (Technical Instructor on the Textiles degree programme). Together, they are exploring new ways of conveying narrative and coded language through the utilization of an array of techniques.

Bryony King provides technical instruction to students taking the Integrated Digital Pathway of the Textiles program at Loughborough University. Her academic background is software-based, whilst her outside interests lie in fabric construction and decoration for garments.

Ikebana – Collaborative Practice Models

Rachel Kelly

Ikebana- Collaborative Practice Models is a presentation of visualisations which arose from collaborative interdisciplinary design workshops at Manchester School of Art. Ikebana, the Japanese Art of flower arranging was hacked as a design methodology to develop the communication of learning within collaborative design practice. The three models presented describe different styles of collaboration including: crossing forms, branching styles and creative abrasion. Ikebana can be used as a teaching tool to support teaching, learning and assessment.

Role of Collaboration: Ikebana workshops involved the arrangement and contemplation of branches and flowers in three dimensional forms, to help students describe and reflect upon their collaborative relationships.



Artist Bio: Rachel Kellv is a Printed Textile Practitioner and Senior Lecturer at Manchester School of Art. Rachel speciaises in interactive design and collaborative practice. Rachel developed Interactive Wallpaper, a studio which explores the value of design practice by sharing design thinking, making and resolutions with the client. Clients include the BBC. Habitat. Ruthin Craft Centre. MRC Clinical Sciences Centre and NHS Trusts and work is held in the collections of the V&A. London and The Whitworth. Manchester. Rachel is undertaking a Scholarship of Teaching and Learning focussing her research on the development of learning tools for collaborative and interdisciplinary design practice.

Contemporary Double-cloth

Ken Ri Kim

The creation of double-faced Jacquard fabric was inspired by traditional double-cloth weaving, often created by using more than two warps to bring two distinctive patterns on the front and back side of a fabric. In this practice, by using two different colours of weft the creation of two separate layers was successfully achieved. Each side of the fabric was designed with an independent figure with full color shading effect. Due to the low flexibility in warp replacement and the limitation on filling yarn supply, Jacquard design can be challenging, this work shows great potential for developing novel designs for digital Jacquard.



Role of Collaboration: In order to convert traditional methods of weaving to modern digital weaving, the collaboration of science and technology disciplines were crucial in developing appropriate weaving applications. Modern electronic Jacquard looms are often set-up with one colour (off-white) of warp. Therefore, a different method is required in designing weave structures and weave patterns. Digital software such as Jacquard CAD and a raster graphics editor were essential in the design process.

Artist Bio: Dr Ken Ri Kim is a Lecturer in Textiles: Innovation and Design at School of the Arts, English and Drama, Loughborough University. She has been developing an innovative Jacquard weaving procedure through experiment-based research. She has professional work experience in the textiles and clothing industry including art and design practice, fashion buying and merchandising, global production sourcing that became a solid foundation for her to combine theories and practice. Her research interests include weaving procedures utilising digital technology for productive, functional, and yet aesthetic woven textiles for colour, material, and texture.

Within the Surface

Geoff Diego Litherland, Angharad McLaren

The artist Geoff Diego Litherland in collaboration with weave designer and researcher Angharad McLaren have produced artists' linen canvas from scratch. Context and narrative are woven within the surface; these linen fabrics create new opportunities to explore the relationship between locality, process, labour and the painted image. The presented works show initial test samples of the collaboration to date.

Role of Collaboration: This collaboration between artist and weave designer/researcher explores how locality of fibre, and the weaving process itself, through structure, pattern and form, can bridge the contextual space between the process of making the fabric, and the narratives of inter-connectivity between humans and nature inherent in Litherland's work.

Artist Bio: Geoff is a Mexican born artist based in Wirksworth, Derbyshire. His painting practice explores contemporary ideas around our relationships to the natural world. He has an MFA in Fine Art from Goldsmiths University and is currently a lecturer in Fine Art at Nottingham Trent University.

Angharad is a Lecturer in Textile Design, Sustainable Clothing Research Coordinator, and former Research Fellow in Design for Clothing Longevity at Nottingham Trent University, with research interests in sustainable fashion and textiles, craft theory and practice, and relationships between community, place and heritage.



American Locality (2017): Indigo and organic cotton

Manonik (Yoshiyuki Minami)

"American Locality (2017): Japanese indigo and organic cotton" is an expression of a locality in the current American material landscape. It explores the possibilities of making garments only with the materials available within a specific locality –Texas. North Carolina, Georgia, and New York. In rethinking sustainability, Manonik curated farmers, mills and artisans to create a distinctive supply chain. In addition. Manonik developed a method, threedimensional pattern weaving, where the parts of the garment were woven in shaped three dimensional forms on a manuallyoperated floor loom, rather than being cut and sewn from a flat rectangular cloth.

Collaborations are an indispensable part of Manonik's garment creation. "American Locality (2017)" explores the color of locally grown Japanese indigo and the use of organic cotton. As locally grown "Japanese indigo" is still scarce and is in an experimental stage in the US, a collaboration



with a dedicated independent farmer like Jeff Silberstein becomes crucial. In addition to the Japanese indigo, this piece uses organic cotton as the base fiber, and thus thread, which also is grown and produced domestically through a group of farmers and mills.

Role of Collaboration: Ikebana workshops involved the arrangement and contemplation of branches and flowers in three dimensional forms, to help students describe and reflect upon their collaborative relationships.

Artist Bio: Manonik is Yoshiyuki Minami. He holds a bachelor's degree in Economic Sociology from University of Michigan and has worked in advertising as an award winning graphic designer and art director. Since establishing Manonik in 2014, Yoshiyuki's contributions to American textile arts have been recognized through artist residencies at the Textile Arts Center in Brooklyn, New York and, most recently, at the Museum of Arts and Design in New York City. Currently, the artist is dedicated to creating one-of-a-kind art-garments in his humble studio in Greenpoint in Brooklyn, New York.



Woolly Wellbeing Reflection Boxes

Alison Mayne

'Woolly Wellbeing Reflection Boxes' - filled with yarn, hand-crafted stationery and suggestions for activity – have facilitated participants in telling their own stories about wellbeing and making. Objects include blanket squares, miniature bonnets, delicate mittens and personalised measurement tools; drawings, journals and photographs record the process of yarncraft and its positive / negative impact on wellbeing; handwritten postcards to the work or the self as maker, support the principle of participant as the interpreter of their own creativity.

Role of Collaboration: Through the 'Woolly Wellbeing Reflection Boxes', participants have told their own stories about wellbeing and crafting with yarn. The boxes were designed as an invitation - providing an opportunity for collaboration where participants engaged with research in personal ways. The objectives focused on having an extended 'conversation' with the participant, eliciting accounts of their experience of craft and wellbeing over time. The process also sought to redress some of the research power balance, asking participants to select what, how much and when to respond, interpret the tasks creatively, take photographs, write in creative journals and postcards, design or stitch.

Artist Bio: Alison Mayne is Scotland-based amateur maker in knit and crochet, Associate Lecturer in Fashion Theory and doctoral researcher in women's crafting experiences at Sheffield Hallam University. Her PhD study explores women's perceptions of wellbeing as they craft alone but share to social media. Participants engaged in contributing data through her 'Woolly Wellbeing Research' Facebook group – a generous crafting online community with hundreds of members from around the world.

Laser Textile Design

Laura Morgan

The exhibit showcases a collection of laser moulded and laser dyed textile samples. This interdisciplinary research intersected design, fibre and dye chemistry and optical engineering to develop four innovative, agile Laser Textile Design techniques that are water, dye and energy efficient. The non-contact techniques allow designs to be processed using a direct-toproduct approach for precision graphic processing and three-dimensional features on wool and synthetic fabrics.

Role of Collaboration: The work was produced as a result of a collaborative research project involving a textile researcher/ practitioner working across design and engineering disciplines with input from industrial partners: Camira, a contract interior manufacturer; and Speedo, a performance swimwear brand. Collaboration allowed commercial feedback to inform the work from technical, performance, creative and environmental perspectives, and ensured results were viable across multiple sectors of the textile industry.



Artist Bio: Dr Laura Morgan is a textile researcher and design practitioner at Loughborough University, with a breadth of experience in commercial design and product development in the fashion and textiles industry. Her work focuses on material and process innovation to design for sustainability.

Rhombille Knots and Notations

Nithikul Nimkulrat, Janette Mathews, Tuomas Nurmi

Following the research-through-design model to conduct the cross-disciplinary collaborative research, pattern development for knotted structures was explored, predicted and modelled through a mathematical characterisation process using knot diagrams and tiling notations. This collaboration has revealed that textile and other craft techniques can be used to transform a complex mathematical idea into a material object to demonstrate proof of concept and also to facilitate the understanding of both the mathematics and the craft. The exhibiting artefacts are examples of new knot designs that are created based on an inspiring perspective offered by mathematicians through the use of Rhombille tiling notations.

Role of Collaboration: The exhibits have resulted from collaboration between a textile practitioner (Nithikul Nimkulrat), a textile designer with educational background



in mathematics (Janette Matthews) and a mathematician (Tuomas Nurmi). The collaboration questions: 1) whether new knotted structures might arise from the use of mathematics in textile knot practice; 2) what might be mathematical concepts that can be used as design tools; and 3) how cross-disciplinary collaboration can bring knowledge from one discipline (ie. mathematics) to provoke research and practice in another (ie.craft/design). Based on these questions, Nimkulrat followed notations/ diagrams generated by Matthews and Nurmi to knot paper string.

Artist Bio: Nithikul Nimkulrat is a Thai textile artist, designer and academic. Her current interest lies in crossdisciplinary collaboration at the intersection of textiles and science and/or technology. Nithikul has worked at Aalto University (FI, 2004–10) and Loughborough University (UK, 2011–13), and is currently Professor and Head of Department of Textile Design at Estonian Academy of Arts (EE, 2013–present). Having situated her work at the intersection of art and design and at that of the academic and art worlds, her creative artefacts have received awards and been exhibited internationally, while her research has been published in peer-reviewed publications.

Denim-Abaca

Wajiha Pervez

As the world becomes increasingly aware of the need to better care for the environment, innovative business models are helping to counter the damage of the fast fashion system – a phenomenon in the fashion industry whereby production processes are expedited in order to get new trends to the market as quickly and cheaply as possible.

Designing products with a focus on their renewability can shift the product-consumer relationship. The closed loop concept of a "circular economy" is emerging as a viable and promising solution to the current linear business model.

This research demonstrates a circular approach to the production of hospitality accessories in an effort to develop new intersections between products, materials, and consumers. The accessories are designed using discarded, reformulated denim – an abundant and underutilized byproduct of the fashion industry – to reduce waste that currently occurs every time hotel chains and airlines produce disposable giveaway products from new materials.

Role of Collaboration: The denim-abaca hybrid material obtained as a result of this collaboration is soft, lightweight, flexible, and has temporary durability that works to the advantage of making hospitality footwear. The material has a potential for being used for developing hotel accessories within a circular economy. It can be cleaned and easily fed back into the hospitality accessories production system because of the simple papermaking techniques and less external additives used in production.









While there remains room for additional explorations, the slippers produced as a part of this collaboration also open up the possibility of using discarded denim to produce amenities that are truly circular in nature.

Artist Bio: Wajiha Pervez is an Interdisciplinary designer, materials enthusiast and traveler from Pakistan. Sustainable practices including selection of appropriate materials, circular economy and material innovation are her particular areas of interest.

A Graduate in Design from Virginia Commonwealth University in Qatar, Wajiha is currently, working as a leather and footwear materials innovator. Living between Netherlands, U.S.A, Qatar, Dubai, Portugal and Pakistan, Wajiha has gained knowledge of a broad spectrum of international design. Dividing her time between work, exhibitions, research and workshops, Wajiha aims to share her knowledge and create meaningful dialogues through design interaction.

Revelation Rug

Gina Pierce, Shyam Lama

The rug was designed and woven for The Fabric of City Exhibition, organised to show a creative response to the Spitalfields Silks. These are luxurious fabrics woven in the 17th and 18th centuries. The reverse side of the woven traditional florals, where the pattern becomes abstracted, was the inspiration for this rug. With the support of Rug-Maker, the rug was woven by hand weaver Shyam Lama, in Nepal, using my design and colour palette. From a simple A4 image, and wool samples for colour reference, Shyam interpreted my ideas, and progress was shared regularly with photographs sent by email.



Role of Collaboration: The rug starts with my interest in working with another maker who uses a hand crafted process. This was important to me, as a reflection of the skills employed by the original Spitalfields weavers whose fabrics inspired this design. Collaborating with the weaver, Shyam, has completed a circle of creative process that began with the Spitalfields weaver interpreting a paper design, to my response to the skills that weaver employed, reinterpreted by another skilled craftsman. An ongoing collaboration across centuries and continents.

Gina Pierce combines textile design practice and research with the position of senior lecturer for print and contextual studies, on BA Textile Design, at The Cass School of Art, Architecture and Design.

Artist Bio: She is studying for a PhD on using textile archives, with the Parker Knoll Collection as a case study. An interest in the stories, histories and information on the industry that textile archives reveal provides the impetus for the research.

In 2015, she organised and curated The Fabric of the City Exhibition and Symposium, at The Cass, supported by an Arts Council grant.

These Shoes Were Made by Warping

Jenny Pinski

These Shoes Were Made by Warping: Warping is the process of winding warp yarns in preparation for weaving on a loom. Weaving by hand provides designers with an in-depth understanding of materials and processes via direct interaction and this provides potential for innovation.

The work consists of selected design outcomes of practice-based research that explores the potential for collaboration in the disciplines of handson woven textiles and commercial footwear design. With the rise of digital



technology, designers are becoming ever more removed from physical interaction with materials and therefore it is timely to explore the role of hand processes in an increasingly digital world.

Role of Collaboration: The underlying research relating to these pieces explores the potential for collaboration between footwear designers and hand-woven textile practitioners. The research project itself involved collaboration between the researcher and footwear industry professionals; this included designers and trend forecasters. The main objective associated with their input was to evaluate of the relevance of textile craft process within the commercial footwear industry. Additional benefits of the collaboration were noted in the positive impact on the development of ideas via creative discussion and input from the professionals.

Artist Bio: Jenny Pinski is a UK based designer researcher whose practice encompasses woven textile and footwear design. With a background in both disciplines she integrates techniques and processes. She uses her knowledge of woven textiles to generate 3D forms using stitch free, zero-waste constructions. While her current practice focuses on footwear, she is interested in developing her work through the application of 3D weaving techniques in other design disciplines.

Enzyme catalysed coloration and surface patterning

Chetna Prajapati, Jinsong Shen, Dr Edward Smith



Enzyme catalysed coloration and surface patterning uses the enzyme laccase to catalyse the polymerisation of various simple aromatic compounds by the means of oxidative coupling reactions to form new coloured compounds useful for textile coloration. The in-situ dyeing process permits the coloration of wool and polyamide fibres via enzymatic oxidation of aromatic compounds to produce a gamut of colours. Key advantages over conventional methods include dyeing using lower than boil temperatures without the use of chemical auxiliaries, eliminating the use of pre-manufactured dyes, in addition to opportunities for multiple colours to be achieved through the simple alteration of processing conditions.

Role of Collaboration: Textile designer Chetna Prajapati worked collaboratively with textile chemists Jinsong Shen and Edward Smith, and industry partners during her doctorate based at De Montfort University to develop four innovative biotechnology-based textile design processes. This holistic approach which brought together science and design disciplines, with industry demonstrates the ability of enzymes (biocatalysts) as creative tools to achieve, through controlled application innovative coloration and decorative surface effects on textiles. Processes developed offer attractive alternatives to conventional chemical processes, with potential economic and environmental benefits.

Artist Bio: Dr Chetna Prajapati is a designer, researcher, and lecturer in Textile Design at Chelsea College of Arts, University of the Arts London. Chetna recently completed her PhD in Textile Biotechnology at De Montfort University, Leicester. Her thesis titled 'Biotechnology for Textile Coloration and Surface Pattern' explored the application of enzymes (biocatalysts) as creative design. Chetnas areas of specialism and research interests include, textile dyeing and printing, textile engineering and biochemistry.

The Emergence of the Goddess

Emilia Louisa Pucci, Laura Devendorf

The emergence of the Goddess is an exploration on the recognition of the Feminine archetype on different levels: spiritual, cultural, ecological, political and social. As a fundamental creative life force, the Feminine reminds us of our interconnectedness and oneness with the Earth and the whole Universe, fostering awareness and an attitude of respect towards the collective well-being of all beings (even those who seem "inanimate"). The soft interactive display recognizes the presence of the "other" and responds by becoming alive, slowly revealing patterned white dots on the surface resembling celestial bodies (but also bacteria, atoms, or breast milk). As the "other" stays longer in dialogue with the display, a set of patters start



connecting the dots together, forming constellations that slowly emerge and submerge into the blue abyss. The slow interaction asks the "other" to pause, take a few deep breaths, and experience the swarming oneness of which she is part.

Role of Collaboration: This work emerged from a collaboration between Emilia Pucci (independent artist and designer), and Laura Devendorf (assistant professor at CU Boulder and academic researcher of dynamic textiles design and fabrication.) The collaboration explores tensions and opportunities when tradition meets innovation. The expertise provided by Devendorf in the domain of thermochromic dyes and smart textiles, together with the facilities of the Devendorf's lab were invaluable for the materialization of the inspirational idea into an interactive art piece. Furthermore, the crosspollination of ideas fostered by the academic environment enriched experimentation and reflection on interactive textiles and their role in contemporary society.

Artist Bio: Emilia Louisa Pucci is an Italian-American designer and artist, she studied Exhibition Design in Italy, followed by a MSc in Design for Interaction at TUDelft, NL. She spent the last few years working as a design consultant, in the business of fostering Happiness through Design. In her practice, she leverages her passion for people's stories to investigate their emotional tensions when interacting with the world, designing experiences with cultural and emotional relevance. Her goal as an artist and designer is to merge traditional craftsmanship and digital technology into soft wearable interfaces that enhance people's experiences.

Laura Devendorf is an Assistant Professor of Information Science and a Fellow of the ATLAS Institute at the University of Colorado, Boulder. She directs the Unstable Design Lab, which explores how instability in technological systems provokes critical reflection and curiosity. Her research on unstable approaches to digital fabrication and wearable technology been featured on Gizmodo.com and National Public Radio.

SOOT – A study of emotionally durable design and textile colorants

Neha Rao

The project 'SOOT – A study of emotionally durable design and textile colorants' explores the emotional connection a consumer has with the product using an innovative method of printing with an air pollutant. The project examined the implications and impact of the 'fast fashion' industry on the environment and resources. The goal was to design a product that was sustainable, personalised and innovative. Research into alternative colorants led the project towards discovering 'soot'. It showed tremendous colouring possibilities and is available as a waste by-product in industries. The use of soot resulted in rich shades of gray on textiles, showing the potential of utilising a waste resource.

Role of Collaboration: Collaboration helped acquire expertise in different subject areas.

Hence, for the scientific aspect of the research it became important to collaborate with colourists, scientists, chemical engineers and academic experts. Collaboration also took place with pharmaceutical industries, as a source of soot for the work.

Artist Bio: Neha is currently pursuing a Masters in Textile Sustainability at Chelsea School of Art and Design. She is a graduate in Textile Design from National Institute of Design, India and had the opportunity to study at the Heriot Watt University in Scotland during an international student exchange program. Neha has gained experience working for various textile companies and designers in London and India. Her interests lie in sustainability and textile design.



Stock Response

Lesley Raven, David Cooper



This work responds to stock images from two books circa1800. The textual description by Carpenter analogises a gromia with the finesse of a master mason, bringing to mind the craft of weaving. In response Raven created the series of tapestries with the aim of displaying these between two mirrors to set up recursive images that support the concept of the stock image. In response to this Cooper penned a series of fragmented texts considering Somerville's status as female author of scientific prose, suggesting thoughts about craft and gender, which influenced the creation of further woven pieces.

Role of Collaboration: This work explores relationships between textile design

and literary studies, site and audience, and material and repetitious qualities of weaving alongside historical and contemporary writing in an iterative process that attempts to engage diverse audiences; previously exhibited at the revered Portico Library and a youth mental health charity, Horsfall Gallery, Manchester. Audiences were invited to respond in writing or drawing facilitating reflection through cognitive, physical and social methods. This extends audience engagement with arts and culture, from bias towards visual output towards broader orientations, informing a new methodology as an antidote to reduced access to the arts (Warwick Report, 2015).

Artist Bio: Lesley Raven is the Programme Leader for the undergraduate Fashion Art Direction degree at Manchester Metropolitan University. Prior to this she was a freelance textile consultant and senior lecturer and in London for over twenty years. Her creative practice is located in fashion and textiles, designing and curating conceptual textile artwork interventions for public display, and producing bespoke pieces for retail and exhibition within the UK and Japan. She is currently a doctorate researcher investigating pedagogies of reflective practice and collaboration towards improving employability within the creative industries.

David Cooper is an academic in English Literature at Manchester Metropolitan University. He has published widely on contemporary poetry and creative non-fiction, as well as (digital) literary cartography. Interested in the productive tensions between critical and creative practices, he has helped to set up the MA/MFA pathway in Place Writing in the Manchester Writing School. Having spent several years as Arts Officer at the Wordsworth Trust, Grasmere, he has a long-standing interest in British Romanticism: a cultural period in which disciplinary boundaries – including those between art and science – were perhaps more dynamically porous than in our own.

Inflection

Jane Scott, Elizabeth Gaston



Inflection is a knitted textile assembly designed as a site specific installation for The Hall of Steel at The Royal Armouries, Leeds. The work is the outcome of interdisciplinary research between Textile Design researchers at The University of Leeds, and the curator of the Oriental Collections at The Royal Armouries, Leeds.

Composed of knitted monofilament tensioned with lasercut Perspex, Inflection responds to the technology of the Chinese Armour Collection held at The Royal Armouries. Using specific pieces from the collection, research investigates the material properties of composite bows and lamellar armour as a material practice to inform constructed textiles at an architectural scale.

Role of Collaboration: The aim of the collaboration was to explore how the material knowledge embodied within historic artefacts could be reimagined using textile materials and CNC knit technologies. Inflection demonstrates the impact of interdisciplinary research through

collaboration across three intersecting levels; between academics, archives and the public using a common language of textiles. Composed of knitted monofilament tensioned with lasercut Perspex, Inflection responds to the technology of the Chinese Armour Collection held at The Royal Armouries. Using specific pieces from the collection, research investigates the material properties of composite bows and lamellar armour as a material practice to inform constructed textiles.

Artist Bio: Dr Jane Scott is a knitted textile design specialist whose research focuses on programmable material systems, environmentally responsive textiles, and biomimicry. Her wider interests interrogate the transformational role of textiles as site specific architectures. Her work has been exhibited internationally and she was recently awarded the Autodesk ACADIA2016 Emerging Research Award (projects category) for her work Programmable Knitting.

Dr Elizabeth Gaston is a textile designer, maker and researcher. An international textile design career has led to her current role as the programme manager of BA Textile Design at the University of Leeds, where she specialises in research and teaching of knitted and stitched textiles.

Open Fashion: Exquisite Corpse

Space Between

'Open Fashion: Exquisite Corpse' by Space Between is a developing fashion decision making system that utilize pre-consumer clothing waste in combination with an emergent web-based information platform. It focuses on using participatory and co-creation design practices to challenge the negative impacts of fashion waste, improving consumer decisionmaking and enabling engagement with the true cost of clothing.



Grids provide a visual starting point signifying the intention to make design and production processes transparent. 'Dark' and 'critical' design informs the work through satirical motifs that draw on the history of clothing and textile production, engaging consumers humorously with ideas around fashion and sustainability.

Role of Collaboration: The Open Fashion project has three main areas of collaboration: i) between varied research practitioners enabling individual nodes of design to connect, building capacity for a flourishing creative network ii) with external partners (NZ basket ball); and iii) with users/consumers through the emerging online co-creation and information system. The work for 'Intersections' aims to provide insight into the emerging system and to engage the public in its creation, enabling feedback loops and empathy building. More broadly, Space Between collaborates with partners including organizations like Earthlink Inc., to increase social mobility and inclusion, alongside the aim of reducing textile and clothing waste.

Artist Bio: Space Between is a fluid collective of practitioners, students and researchers operating from Massey University's School of Design, with the shared vision of a circular economy. It is positioned as: an antidote or disruption to the current fashion and textiles system; a social innovation that addresses a 'multitude of truths', economic, political, social, ecological, ethical, and cultural (Fuad Luke 2009. p.xxi); and a platform for an alternative role for the fashion and textiles designer, outside the limits of 'take, make and waste'. Founder: Jennifer Whitty. Design Associates for Open Fashion: Larissa Banks, Faith Kane, Harita Kapur, Natasha Wall, Liam Madden, Samantha Hodgins



Design for

Nanci Takeyama

This project aimed to re-think and reposition the role of the designer when working with cultural heritage. This project took inspiration to investigate on the lost meanings of the Cosmic Serpent in Laos. Through academic research and consultation with Lao textile experts this project could unveil some meanings, share them with weavers through workshops. In creative sessions we co-created products applying the motifs to emphasize their original meanings; a bridge between academic research and design was created, becoming the most unique feature of this project.

Role of Collaboration: The products featured in this exhibition are works developed in collaborations with textile based communities in Laos. Our research group investigated the lost meanings of the motifs of the Cosmic Serpent in Laotian textiles, moreover we shared these meanings through workshops with weaving communities. Later we collaboratively designed products by applying the motifs of the Cosmic Serpents to highlight their meanings of the motifs respecting its cultural context.

Artist Bio: Dr. Nanci Takeyama has received her Bachelor degree in Architecture and Urban Planning from Sao Paulo University, Master of Design from Kyushu University and Ph.D. in Design Research from the Kobe Design University. Nanci is the founding director of 'design for', a group engaged in utilising scholarly research to advocate cultural understanding and preservation by using design as a dialogue. Through this dialogue, 'design for' aims to translate, reinterpret, adapt crafts and designs in collaboration with traditional artisans. In 2013 this project won an Honourable Commendation from Asia-Pacific Programme of Educational Innovation for Development (APEID), UNESCO.

Trying it On

Katherine Townsend, Ania Sadkowska, Juliana Sissons, Karen Harrigan, Katherine West, Jim Boxall

Trying it On is a film and fashion installation that provides insights into the role and practice of trying things on. The footage captures a group of older women (55-75) from Nottingham, UK participating in the Emotional Fit research project (Townsend et al 2016). The participants are recorded in various scenarios testing fit, modeling and presenting garments they have co-created with the researchers. The sequences reveal the women's embodied responses to textile and dress objects through socio-material interactions. The film is augmented by 12 garment prototypes made through the collaboration; combining bespoke textiles, geometric cutting and minimal waste principles in support of garment longevity.



Role of Collaboration: Collaboration is central to the Emotional Fit project's research methodology. Firstly,

team working needed to be established between the researcher/practitioners, who have expertise in fashion, textiles, and knitwear design, pattern cutting, performance and film production. Secondly, the co-creation of a collection of experimental garment prototypes with a group of 45 older women was dependent on various modes of participation. These included different relationships between researchers and participants through one-toone interviews, workshops, show-and-tell, measuring and fitting sessions, photo shoots, and rehearsals for a public performance. In each scenario the generous exchanging of knowledge and skills was essential in sustaining the spirit and success of the project.

Artist Bio: Dr Katherine Townsend is a practitioner, researcher and curator who combines these roles as a Reader in Fashion and Textile Crafts at Nottingham Trent University.

Dr Ania Sadkowska is a lecturer and researcher in fashion design at Coventry University. Her research explores the intersection of sociology and psychology with art and design practices.

Juliana Sissons is a designer and lecturer in pattern cutting. She was awarded a Crafts Council Development Award (2003) for her label which focuses on the development of sculptural techniques and pattern making.

Karen Harrigan is a Senior Lecturer in Fashion Design at Nottingham Trent University with specialist knowledge of pattern cutting and garment construction.

Katherine West is a Research Fellow in Fashion Design for an Ageing Female Demographic (School of Art & Design) and a Research Assistant in Clothing Longevity (School of Architecture, Design & Built Environment), at Nottingham Trent University.

Jim Boxall is an artist, performer, and filmmaker who produces short films, documentaries, live performances and experimental art installations.

Clinique Vestimentaire

Jeanne Vicerial

"In the consciousness of man and his anatomy, the designers and researchers of the clothing clinic propose alternative concepts to the contemporary textile industry" – Print the body.

I drew on my research of human anatomy and the body to rethink the construction of clothing. My work is an analogy between body and clothing, I used the model of human muscular weaves for my designs. All my patterns are extracted from the human anatomy to create a new, wearable, skin. Each piece is made entirely from one recycled thread. This experimental method is done exclusively



by hand without the use of a sewing machine. This method is currently artisanal, the objective is to develop a machine capable of sewing customized clothing based on a 3D scan of the body.

Today, I'm continuing this research for my PhD in fashion textiles research alongside engineers who have the capability to develop this new technology. The development of this method both eliminates textiles waste and proposes a different form of industrial customised clothing production.

Role of Collaboration: The role of the collaboration in my work is essential. It makes me confront universes who don't normally work together. As robotics and sewing, engineers and designers, surgeons and textile designers, dressmakers. I try to make all my research & process with a collaboration. Make a mix between sciences, design and art is one of my focus today. In this research the collaboration permitted to develop a new sewing machine.

Artist Bio: Jeanne Vicerial is currently engaged in the mildly self-sabotaging project of creating a robot to replace herself. It's just one of the mad-scientist fashion experiments the designer has been playing around with recently, as she attempts to reshape the laws of fashion in her laboratory-slash-studio. Her master's thesis at Paris Sciences et Lettres university was titled "Un corps surmesure," meaning "A Tailor-Made Body." She focused on mimicking the anatomical structure of the human form, using strings to imitate sinews. It's a high-tech version of couture, made in the birthplace of the practice. Most impressively of all, each piece was made from a single, 466-kilometer-long thread. She's currently completing a Ph.D at SACRE EnsAD - PSL Research University, Paris.

Indigo: the promise of more alchemy

Alison Welsh



The research project Indigo: the promise of more alchemy has resulted in a collection of research samples, indigo dyed garments and photographs which record and celebrate the 'back story' of production: who makes the fabrics we wear? Indigo investigates the fashion design potential of traditional dyeing and block printing methods from Kachcch in Northern India. Craft is making a comeback; the love of the handmade is replacing the consumption of sterile branded goods as the luxury of tomorrow. Fashion has not previously been associated with craft, at least not in the manner that ceramics. jewellery or woodcarving have been. Fashion is associated with mass manufacturing, speed of production and high profit margins. Craft is synonymous with the slow, the laborious, and the unprofitable. How can crafted fashion goods possibly be the future? This project seeks to answer that question, by developing a transnational craft collaboration between England and India: a British designerworking with skilled rural artisans in Gujarat to develop a range of

contemporary garments using natural indigo dyes.

Role of Collaboration: For a number of years Alison has worked alongside an Indian master weaver to develop designs for organically dyed fabrics, based on the heritage of the traditional weaving motifs of his community. These designs were hand woven on 'pit looms' in the village of Bhujodi, home to around 200 weavers. This new Indigo range also includes garments printed and resist dyed with the natural indigo dyes produced by specialist Khatri craftsmen from the ajrakh block-printing and tiedying communities of Kutch. Indigo aims to showcase the indigenous crafts of Gujarat, and to deliver positive social and economic impact to the rural artisans of Kachcch, through the creation of sustainable products.

Artist Bio: Alison Welsh is Head of Fashion Research at Manchester Metropolitan University. She studied Fashion at Newcastle Polytechnic, and worked as a trend forecaster in London during the 1980's before joining Manchester School of Art in 1991, where she headed up the BA (Hons) Fashion Programme for 20 years. She has been a trustee of Graduate Fashion Week since 2004. She is a practicing artist and designer, her work has been exhibited in Japan, China, and India and regularly within the UK. Recently she has developed a series of women's garments in response to her field research into classic Indian menswear.

Conceptual fashion narratives through site-specific cultural partnerships

Andrea Zapp

Conceptual garments exploring fashion and media narratives. Distinct photography forms the continuum with imagery carefully mapped onto patterns, creating intrinsic fabric textures and garment shapes. The designs depict cultural heritage through site-specific research with archives leading to new collection stories and fashion artefacts. Dress "Figurines" for Manchester Art Gallery, interpreting objects from the special collections; Dress "Yellow Weave" for Paradise Mill Silk Museum Macclesfield, re-imagining the museum's historic manufacture for the 21st century; Windbreaker "Macaroni Penguin" for the British Antarctic Survey in Cambridge, exploring environmental research imagery from the South Pole and inspired by early explorer apparel and Inuit folklore.

Role of Collaboration: Collaborations to date have included dress ranges for Manchester Art Gallery that interpreted objects from the special collections; for the Paradise Mill Silk Museum Macclesfield that re-imagined the museum's archive and machinery for the 21st century; or a current collaboration with the British Antarctic Survey in Cambridge that explores environmental research imagery from the South Pole in scarves and windbreaker garments.

Artist Bio: Senior Research Fellow in Creative Technologies and Fashion at Manchester Metropolitan University. Internationally exhibiting media artist since the Mid 90s and fashion designer with a strong artistic manifest. Focus on narrative imagery for textile and fashion, currently also investigating the potential of future smart materials and technologies for new visual design concepts. In 2014 launch of fashion, media and design company AZ.andreazapp/ Media Textiles Ltd. Conceptual photography-based fashion design and exhibitions of collections at the Saatchi Gallery London, Bunka Costume Gallery Tokyo, Paris and Singapore Fashion Week. Site-specific visual design stories and retailed limited editions with partners in the creative sector.



InBetween

Verena Ziegler

Imagining "the world as a huge kitchen, well stocked with ingredients of all sorts" (Ingold 2010, p. 8), creative, intuitive InBetween research blended these ingredients and combined them in processes of transformation. Seeing the world full of substances and phenomena, the project entered a hybrid research space situated between an alchemical "Wunderkammer" (Leibniz 1600; Munster 2006) and the scientific rigor of modern forms of collaborative investigations and the tool-making characteristic of



state-of-the-art science laboratories. This hybrid constitutes the design tool and exhibition format proposed here.

Role of Collaboration: This exhibition work addresses the potential for holistic experimentation in interdisciplinary collaborations based on embodied experiences and ideas. It was a collaboration between Verena Zieglaer and: Julien Dihrik, Mechanical Engineering student at Open Innovation Lab Constance / University of Applied Sciences; Dipl. Phys. Dr. rer. nat. Stefan Gerlach, a lecturer in theoretical physics at the University of Constance; and Luke Franzke and Clemens Winkler, research associates at University of Arts Zurich.

Artist Bio: Verena Ziegler trained as an architect (Dipl. Ing. Architecture TH). She holds an MA in Textile Design an MA in Design. She is currently undertaking her practice-based PhD. Verena is a Research Associate at the Faculty of Design, Department of Interaction Design, Zurich University of the Arts (Switzerland). She received a two-year Brigitte-Schlieben-Lange Research Grant for Excellent Junior Female Scientists and Artists with Children to undertake her PhD research at the Open Innovation Lab (OIL), Constance University of Applied Sciences for Technology and Economics (HTWG, Germany). The OIL specializes in interdisciplinary digital fabrication methods. Her PhD focuses on developing bionic principles for creating alternative lightweight building structures using textiles and digital fabrication techniques in an interdisciplinary framework between architecture, textile design, and interaction design.



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textileintersections