E-Textiles Conference.....

We are E-Stitches

Sara Robertson

Sara co-runs Sara + Sarah Smart Textile Design, a research-led textile practice working as a maker, researcher and consultant.

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working to develop technologies and tools to encourage more sustainable approaches to textiles and clothing.

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The E-Stitches Collective is a dynamic international community of creators, makers, hackers, designers, bio-technologists, performers, and researchers. We're dedicated to crafting new experiences of e-textiles, soft systems, and wearable technologies as speculation, as art or through design, for the benefit of people, society and the environment.

Our passion for materials, design, art and craft fuels the discovery of new possibilities at the intersection of textiles and technology. Through regular meet-ups, we provide access to news, tutorials, and events, offering guidance on the latest in e-textiles and wearable tech.

Our community is a hub for collaboration, supporting discussions on emerging textile cultures, showcasing work, and demonstrating cutting-edge techniques.

Become a part of a growing network of innovators! Becoming part of the collective provides:

- A platform to showcase your e-stitches projects;
- Insight and discussion on emergent textile research;
- First access to workshops/demos and showcasing opportunities;
- Access to a network of like-minded people making e-textiles.

Welcome to Issue 1 of the E-Stitches Zine - enjoy the wonderful projects of past and present from our community of makers!

Name: Emma Shannon and Dettifoss Bergmann Project: Those in Glasshouses Follow: @winkstex

Those in Glasshouses is the first in a series of three collaborative works made by Icelandic artist and musician Dettifoss Bergmann and Scottish Textile artist Emma Shannon. Their work explores the interactions between traditional craft and wearable technology in a fun and playful way for use in performance and education. Those in Glasshouses was inspired by Emma's first digital photograph, taken in 2004, of the roof of Queens Park Glasshouse in Glasgow. Using only waste fabric sourced locally, the piece was hand embroidered and painted, recreating the photograph in 2D then brought back into 3D on the body. Using five meters of fully programable LEDs embedded seamlessly, this concept is brought into the modern world as a soft, wearable sculpture. Two companion pieces are in production for a performance at the Reykjavik Winter Lights Festival in February 2025. All three garments will be embedded with different soft sensors that react with the perfomers movements and will be accompanied by a new musical composition by Dettifoss. They are currently working with a technician to develop battery packs made from discarded Ecigarette lithium batteries to power these works in a more sustainable way. Those in Glasshouses has been shown at Erlendur Fashion Week Iceland and at the Icelandic Textile Lab in Blönduós.



Close up of Those in Glasshouses. Those in Glasshouses worn by performer Nóra Siroki, Reykjavík, Iceland October 2024.

Name: Craftwork Project: Craftwork Follow: @craftwork_collective / <u>craftwork.today</u>

Craftwork, founded by Nicole Yi Messier and Victoria Manganiello, is a multidisciplinary design and art studio exploring the nature of textiles and technology through installations, storytelling, and material-based research. Craftwork's broad-based skill set focuses on creative technologies, textile fabrication, and novel materials, all investigated through historical and cultural contexts. Embracing collaboration, we intentionally engage in experimental techniques across both physical and digital realms, often intertwined.



'Ancient Futures' is a multi-layered woven textile whose surface visually fluctuates based on the sentiment analysis of visitors' shared stories. It is a participatory media installation capturing sonic textures and creating an evolving fabric of soundscape. Inspired by the textiles that have held humanity's secrets across time and space, this triple-woven installation is made with soft electronics to collect, store and cumulatively visualize solicited secrets from viewers using sentiment analysis and long term data-textile storage. Ancient Incans used Quipu to document economic and civil data. Enslaved people created a system of railroad quilts as they traversed the Antebellum Southern USA. During WWII, women knit secret war strategies into the sweaters of spies. Technical methods in weaving, knitting, sewing, etc. are able to hide and deliver sensitive details and encode important messages with a visual language that all humans are intimately familiar with: textile.



18 woven textile panels with fiber optics, LEDs, computer, microphone, open Frameworks software, and Arduino, 4ft X 8ft X 8ft, 2024.





A series of images including Craftwork logo, studio headshot of Victoria Manganiello and Nicole Yi Messier, and image of their ongoing research project, called Algorithmic Textures.

Name: Emma Wright - Studio Osmo Project: Home Grown Follow: @osmo.materials / @emma_harriet

Home Grown is a bio-based collection offering mindful, locally-sourced UK and Irish materials crafted through traditional techniques as alternative tools for digital interaction. Using ambient technology, it explores the user's relationship with these objects, encouraging care and enhancing understanding, longevity, and deeper connections with everyday items.





A woven bio-based touchpad (top) created from a conductive biomateral (bottom right) created using a variety of natural materials. A PCB attached to insulative and conductive biomatierals.

Name: Studio Osmo Project: Transcend Matter – podcast Follow: Spotify / YouTube / Apple Podcasts

This podcast aims to explore the fascinating interplay of materials that not only redefine aesthetics but address pressing human and environmental challenges. Humanising skill sets between academia and design to promote cross collaboration, driving the innovation for future materials.



(Left) Catherine Mondoa, material researcher at Material Connection. (Right) Scott Fullbright, CEO and Founder of Living Ink Technologies.

Name: Rachel Freire, Joachim Rotteveel, Adam Stark, Rebecca Odedra & Melissa Coleman Project: Bolero 2.0

An interactive bolero which allows singer Imogen Heap to express her music as a visual extension of her body. The garment's electronics consist of jewelled programmable LEDs, a microcontroller and wireless mic packs. The bolero connects to Imogen's interactive platform Glover where her MiMU Gloves and voice can change the speed, colour and pattern of the bolero's lights.





(Top) The bolero that was worn by Imogen on tour. (Bottom left) electronics close up on the transparent harness. (Bottom right) a first design draft.

Name: Melissa Coleman & Rachel FreireProject: Etextile CrystallographyFollow: @melissakatecoleman / @rachelfreirestudio

This project explores growing luxurious futuristic garments with salt crystals on a washable and reusable electronic base garment. The base consists of etextile taffeta traces, customised DotStar miniature LEDs, and resistors. When it needs cleaning or has shed too many crystals it may be sent back to the crystallographer to be regrown into a new shape.







Different phases of crystals grown onto an electronic base garment.

Name: Sara + Sarah Smart Textile Design Project: Digital Lace Follow: @smarttextiledesign

Digital Lace is a digitally-activated responsive textile sampler held on a wooden frame, and takes inspiration from rare, 17th century lace samplers held at the National Museums' Collection, Scotland. The research concept for *Digital Lace* was one of six proposals selected for an Expert Workshop: Rejuvenating Craft, Plymouth College of Art, (2014) which presented the challenge to create unique products utilising novel material properties and digital making.

The project was collaborative building on prior research knowledge in the area of woven polymer optical fibre and the application of liquid crystal thermochromic dye systems to textiles. The research revealed new ways of working with these materials in combination with soft circuitry and open source micro-control platforms for smart textiles. It resulted in new processes, tools and presented a new programmable material to bring to life archive textiles often hidden from a public audience. *Digital Lace* won the International Symposium of Wearable Computers 2014 Design Jury Award for Fibre Art, and was showcased at the EMP Building and Microsoft Research Studio 99 in Seattle.



(Left) Digital lace close up of surface combining liquid crystal and aligned optical fibre. (Right) Digital Lace on Stand.

Name: Sara + Sarah Smart Textile DesignProject: Light Emitting LaceFollow: @smarttextiledesign / @mybtextiles1900

Light Emitting Lace was developed in collaboration with MYB Textiles a renowned heritage lace mill in Scotland. Working on site we were able to design, weave, and test, building a knowledge base for designing light emitting Scottish leno gauze (madras) lace structures through a range of prototypes. The project was funded by the Textile Future Forum Innovation awards.



Light emission tests, showing different qualities of light and shadow as pattern, 2016.

Name: Wuthigrai Sirphon & Bine Roth Project: Soft shapeshifters Follow: @peut_porter

Soft shapeshifters is the result of a residency funded by the British Council Thailand. It blends the realms of textiles and electronics, exploring textile technologies as powerful tool for embodied knowledge. This project challenges traditional notions critically and artistically by weaving together past, present, and future narratives through the loom as a body-based expressive device.

Participants engage with tools, technologies, and weaving methods, not merely as observers but as active contributors to a dialogue. This interaction encourages the co-construction of new experiences, revealing hidden potentials in often undervalued knowledge and skills.

This collaborative project grew out of conversations around the social fabric and the application of textile techniques in social contexts. The loom, with its tactile and rhythmic process, transforms into an instrument where people can connect, and reflect on the intersection of technology, tradition, and personal expression. Each weaver is connected to a sound which is activated through the pressure in the belts.



Connecting four backstrap weavers – each belt is a woven pressure sensor to connect to a sound depending on their movements and the pressure put into the weaving process.

Name: Bruixes Lab, Masako Matsushita Project: Matermorfo Follow: @bruixes_lab / @tam_matsu

Current technology tends to simplify the complexity of human beings, often neglecting the richness of different experiences and individualities. This reduction can lead to a limited vision of human identity.

Matermorfo is a performative costume that combines second skins (such as algae-based biotextiles, kombucha, latex, silicon) and electronics (such as pumps, motors, push-buttons) to create bio-soft robotics to integrate a new level of complexity and symbiotic approach to AI learning processes. The project proposes a material symbiosis that goes beyond conventional representations of the human body, exploring the complexity and diversity of shapes, textures, colours and sounds.

In *Matermorfo*, the body and costume actively participate in the generation of matter, movements and prostheses to dynamically adapt to different Al technologies.



Matermorfo, performance at Villa Imperiale, Pesaro (September '24). Interactive costume designed by Bruixes Lab performed by Masako Matsushita in collaboration with HangartFest, Umanesimo Artificiale e Villa Imperiale Pesaro.

Name: Jessica Stanley Project: Rainy Day Synth Follow: @j.stan_

Rainy Day Synth is a wearable musical instrument that turns raindrops into sound, augmenting the experience of walking in the rain. A large moisture sensor on the back of a rain cape is connected to a synthesizer circuit concealed in a pocket, and rain falling on the sensor changes its resistance, which controls the sound generated. Created in 2024 at PIFcamp in Soča, Slovenia.



(Top) Rainy Day Synth detecting raindrops falling on the rain sensor and converting them into sound. (Left) Close up of the rain sensor, copper tape on polyurethane. (Right) Prototyping with participants at PIFcamp in Slovenia.

Name: Lucie Hernandez Project: Sound Sample Player Follow: @touchcrafttextiles

The *Sound Sample Player* is an analogue sensor demo box. It plays back MP3 sound files as you manipulate the textile sensors connected to a pair of crocodile clips. Each connection channel is equipped with adjustable voltage dividers to enable people to select a suitable range for the textile sensors. The sound sample player was designed as a teaching tool to help people learn to control sound using textile sensors. LEDs display sensor readings.



Textile sensors with conductive materials are attached to the sound sample player using crocodile clips. Testing the sound sample player at an e-stitches event in Bristol. Close up of sound sample player controls and displays.

Name: Dr Lucy Robertson Project: Sonic Flock Follow: @LucyRobertsonDesigns

Sonic Flock explored how textiles can foster conversations in dementia-friendly communities in the Outer Hebrides. Textile birds, crowd-sourced from the UK and enhanced to play bird songs with touch, were displayed in An Lanntairs gallery for the Cuimhne exhibition. They were later gifted to residents in care homes across the Outer Hebrides.



(Top) Birds in copper lined embroidery hoops play bird song when touched. (Left) A collection of knitted birds sparking conversations in a Uist care home. (Right) Fabric bir d fitted with basic circuit to tweet when wings touch.

Name: Affection Project: Wearable Installation Follow: @marianpierantoni

Affection consists in woven stretches arranged in the form of arms, and an electronic system was attached to provide them with an inner organic movement. These woven arms finish on resting points pillows in all the space around, inviting the public to sit and curl up with the knitting.

I called together a group of volunteers through a Facebook page to take part in the work by weaving one or several balls of wool. The volunteers were identified by the colour of wool they used, and this was portrayed in a book on a cushion, which resembled a storybook. They not met before and did not know what the work was going to result into.

Phrases from they were used for an intervention on the walls that surrounded the installation. The wearable installation was an experience from start to finish. People was connected through the installed wearable and the knitting.



(Left) 'Affection' at MUNTREF, Buenos Aires, Argentina (2014). (Right) People experiencing the wearable installation.



Sofia Guridi - Fully BioBased Pressure Sensor / @sofia.guridi



Name: Fashion Tech Farm Project: Fashion Tech Incubator Follow: @fashiontechfarm

Fashion Tech Farm is a studio, incubator and production facility for innovative fashion. More than 8 companies call the Fashion Tech Farm their home. From a dynamic workshop with the associated Fashion Tech tools, we support companies in their textile, electronics, and garment R&D processes, make prototypes of future garments, produce innovative textile products and art. We all have a separate administration and client base, but share tools, network, and lunch.







(Top) The exterior and interior of the Fashion Tech Farm in Eindhoven, The Netherlands. (Left) some of the tools. (Right) The work and exhibition space, including some of the current e-textile projects.

Name: Nigel Guérin-Garnett Project: Machinatia Follow: @corpoveillance

Machinatia embodies a choreographic-technological practice, devised to develop new material, and explore questions of agency within the advancement of AI. The remotely operated system was designed with dancers from Studio Wayne McGregor, which resulted in two bespoke garments that can house a physical computing apparatus, acting as a translator to catalyse digital material into physical through the dancers' improvisations.



(Top) Prototype experimenting with dancer Jordan James Bridge. (Left) Harness design on mannequin, 2022. (Right) Machinatia display, 2023.

Name: No Ordinary Cloth Project: No Ordinary Cloth podcast Follow: @noordinarycloth

No Ordinary Cloth podcast, created and hosted by Mili Tharakan, showcases the works and stories of visionaries innovating at the intersection of textiles, emerging technology, craft and sustainability. The entire Textile industry is currently undergoing a radical transformation. Developments in biochemistry, material science, flexible electronics, nanotechnology, robotics, AI and other emerging tech are disrupting how we make, use and repurpose textiles.

On this podcast, industry experts driving this transformation give you a peek into their experiments and inventions, share about their creative processes, challenges and successes and how they followed their vision and navigated unchartered territories to become drivers of change.

Listen to stories that will light up your imagination, inform your work and connect you to a community exploring the endless possibilities of textiles. Listen here: www.noordinarycloth.com, Spotify and Apple Podcast.

Name: Pauline Stockmann Project: E-MERGENCE Follow: @thecrazylineofficial

E-MERGENCE is a graduate collection developed in cooperation with the Fraunhofer IZM Berlin. Its concept is to show the functional diversity of e-textiles as well as to explore contemporary and future-oriented design approaches for them, taking circular design aspects into account.

The neurological condition of epilepsy served as both inspiration and field of application, as it not only starts a discussion about how e-textiles work and how similar they can be to the neuronal functions in the human body, but also how e-textiles can help tackle this disease and related health issues such as anxiety and stress management.

In addition to a modular e-textile toolkit, various manufacturing techniques were used to realize this collection, such as technical embroidery, e-textile bonding and upcycling methods. This work was supervised by Prof Johanna Michel from HTW Berlin and Sigrid Rotzler from Fraunhofer IZM.



We are weaving together a tapestry of textile innovations, one episode at a time. The guests on the podcast range from researchers, entrepreneurs, designers and artists from a wide range of disciplines.



(Left) Embroidered tracks and bonded modules providing different external stimuli depending on individual needs, 2023. (Right) Interactive outfits with LEDs to visualize the measured stress level, 2023.

Name: Pournima Shinde Project: E-phemeral Follow: @pournimoon

E-phemeral explores how speculative design can inform Colour, Material, Finish (CMF) strategies to enhance future passenger experiences through innovation. This project integrates technology with innovative materials to create adaptive, sensory interactions that are both functional and emotionally impactful. By combining smart materials with origami-inspired structures, I crafted interactive designs in paper and woven formats. These responsive, shape-shifting structures allowed me to explore the intersection of digitality and materiality, envisioning practical applications for future transportation.

Often, technological advancements are seen as cold or impersonal; this project reimagines how textiles and materials can be functional yet emotionally resonant, providing a softer, more approachable interface. Through responsive materials that enhance comfort and engagement, *E-phemeral* fosters a deeper connection between users and their surroundings. By merging speculative design, material innovation, and sustainability, this project offers a forward-thinking, emotionally resonant CMF solution for the future of transportation.

Name: Rain Ashford Project: <u>https://rainycatz.wordpress.com</u> Follow: <u>https://doi.org/10.1145/2800835.2801673</u>

The fibre optic ThinkerBelle EEG Amplifying Dress was designed as a response to doctoral research with young women who vocalised enthusiasm for an emotive wearable that could visualise and convey their physiological data to others via an illuminated garment. The research investigated the functionality, aesthetics and user experience of wearables and in particular wearer and observer feedback with EEG.

The motivation for creating the dress was for engagement in social situations in which the wearer might find themselves in a noisy, dimly lit or crowded area, where it is not possible to hear others and communicate easily – where forms of non-verbal communication may be useful. The dress broadcasts EEG "meditation" (green) and "attention" (red) data of the wearer for observers to make their own interpretations. It is up to the wearer if they want to divulge information regarding the physiological source of the data being visualised. The fibre optic strands woven into organza are positionable for personalisation and move with the body when dancing.



(Left) Handwoven sample with metal spun yarn, lurex, glow-in-the-dark yarn, and wire. (Right) Glow-in-the-dark sample highlighting the creases and folds of its origami form.



(Left) A close up of the dress showing elevated levels of "meditation' (gre7en3) a.n5d m"attmenti oxn' (9re6d) mEEGm data on fibre optic organza. (Right) Full length of dress shows opportunity for personalisation and movement.

Name: Sabrina Recoules Quang Project: Storytelling with programmable textiles Follow: @sabrina_theatredu1k

Designing characters with programmable textile and natural materials is an ongoing exploration of the interference between human, technology and nature as a trigger for telling stories. The combination of electronic circuitry and hand manipulations perform a system of mechanical artefacts and textile processed characters embedded with colour-changing dyes in front and behind a chromic screen.



(Top) Thermochromic shadows and black silhouettes activated by electronic circuit, Hand manipulated Textile and vegetal puppets. (Left & Right) Thermochromic puppet activated by sun heat.

Name: Sara Nevay Project: Soft Sound Spheres Follow: @drsaranevay

Co-designed with older adults, these *Soft Sound Sphere* prototypes aim to playfully support social connectedness in later life. The Spheres contain speakers and bespoke playlists of sounds and songs to inspire conversation, storytelling and play, and are activated through individual tactile interactions inspired by their form and materiality, e.g., squeezing and stroking.



The gestural interactions required to activate the Soft Sound Spheres. (Top) Pinch Sphere using conductive fabric contact switch. (Left) Squeeze Sphere using Velostat pressure sensor. (Right) Stroke Sphere using conductive yarn stroke sensor.

Name: Sarah Taylor (Tom Flint & Zack Moir, Edinburgh Project: POF Throwies, Light Up The Trails, Glentress Follow: @dmbins / @smarttextiledesign

POF Throwies are custom-made dual-purpose wearable and installation art light pieces combining polymer optical fibre (POF) bundles housed in bespoke ferrules containing battery powered LEDs and magnets. They were designed for an interactive, light and sound, night-time riding event to enhance the movement of light during cycling and as a combined magnetic static art piece.





(Top) Multiple POF Throwies magnetically attached to a 2m² open frame metal cube light installation. (Left) Cyclists with wearable Throwies and creating the art installation (Right), Light Up The Trails, Glentress, Scotland.

Name: Marika Grasso Project: Conductive screens Follow: @marikajasminegrasso

Responsiveness is explored as a frail and vulnerable space for the relationship between the researcher/maker and the unresponsive material. During the COVID-19 pandemic, I investigated responsive materialities to examine the entanglement with everyday devices through tactile encounters under the frame of Intra-action (Barad, 2007) and the production of soft materialities to share with the public.



(Top) A goldleaf work with screen protectors.(Left) A touch screen with wires, and dioode activated by touch. (Right) An experiment with dissolvable materials,conductive threads and gold leaf fragments.

Name: Zoe Romano Project: Clotho - Designed for Symbiotic Living Follow: @clotho.it

Clotho is the first family of fiber2fiber circular textile able to shield Electromagnetic fields (EMF) and acting as a barrier to protect our bodies from an urban environment densely populated by electronics like devices and antennas. Since 2020 Italian-based Clotho developed high quality textiles, with the look and feel of traditional textiles, able to shield EMF and fulfill the demand of an expanding niche of customers sensitive to electro pollution.

The added value of *Clotho* is its circularity approach: we managed to adopt a closed-loop solution, meaning that after spinning, weaving and manufacturing textile, a used and returned *Clotho* product can be disassembled and shred to become raw material that can be used for spinning and weaving again a textile with similar EMF shielding properties.

Clotho provides customisable high-quality and certified shielding textile to fashion companies wanting to offer this functional benefit to their customers and embrace the transition.



Clotho Capsule Collection - Pregnancy Friendly Hoodie in cotton and metal - available in two sizes on demand.

Name: Emilie GilesProject: Weaving Lighthouses and Stitching StoriesFollow: @me_backwards

A series of participatory workshops during my PhD, the work consists of a collection of personal e-textile pieces created by makers who have a visual impairment. Each piece is related to something important in their life such as a family member, an experience or a loved activity. The collaboration was with the charity BucksVision and their sub-group Eye For Art.



(Top) Touch, Listen And Use Your Imagination by Sigrid Muller. (Right) My Achilles Healed by Jo-Ann Knight. (Left) The Electric Light Orchestra by Paula Suchy.

Name: Tincuta Heinzel, Yukihiro Tokumoto, Tomohiro Inoue, Julia Cassim Project: Capacitive Folding Jacquard Weave Follow: @lboro_textiles

Context:

Capacitive Folding Jacquard Weave is a series of samples resulting from the collaboration between the Kyoto Prefectural Institute for Northern Industry, Japan working with the international network created by the annual Textiles Summer School in Kyoto initiated and directed by Prof. Julia Cassim. The overall aim of the project has been to explore new weave and product possibilities using the weave, yarn, and process technology of Tango chirimen crepe, a traditional kimono fabric from Kyoto and the Japanese Jacquard loom.

Design concept:

The design concept aimed to pay homage to Issey Miyake's 'Pleats, Please!' (Miyake, 2012). The project combines the self-folding weaved textiles structures with the principle of electronic capacitance, allowing sensing the changes in capacitance caused by the expansion and contraction of the pleats to produce a sound as with an accordion. The project was conceived as a pedagogical tool for the teaching of e-textiles.



Photos of the weaved capacitive self-folding samples produced during the Textiles Summer School Kyoto in 2022.

Name: Zhan Qu Project: Knitted Wearables for Inclusive and Interactive forms of Movement and Dance Follow: @parallel_spacetime_zhan

The project presents the design of novel flexible micro-structured electrodes that can simultaneously achieve flexibility to fit the curves of the body and provide efficient electrophysiological detection technology. Embedded EMG sensors are designed to create a high performance knitted wearable monitoring electrical signals generated by the dancers muscles. This enables accurate real-time movement data.

Prior to this my work began developing a wearable kinaesthetic system that integrated sensors and circuitry into wearable knitted clothing. The system was designed to allow audience members to 'feel' dance onstage, communicating the 'flow', the 'direction', and the ' movement' of the dancers to those audience members who may be unable to engage in dance.

https://2022.rca.ac.uk/students/zhan-qu/



Seamless with FPC board (front)





Protruding electrode

Wrapping with FPC board (Double layer structure)

Knitting Hydrophobic yarns

Visualisations of the knitted wearable system and close up of the embedded sensors.



E-stitches Collective

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