



WEAR
sustain

WEARABLE TECHNOLOGISTS
ENGAGE WITH ARTISTS FOR
RESPONSIBLE INNOVATION

WINNER OF THE EU HORIZON 2020 'INNOVATION ACTION' ICT-36-2016 AWARD

AN AESTHETIC, ETHICAL AND CRITICAL APPROACH TO WEARABLE TECHNOLOGIES, SMART AND E-TEXTILE DEVELOPMENT

A TWO YEAR INNOVATION ACTION [2017 – 2018]

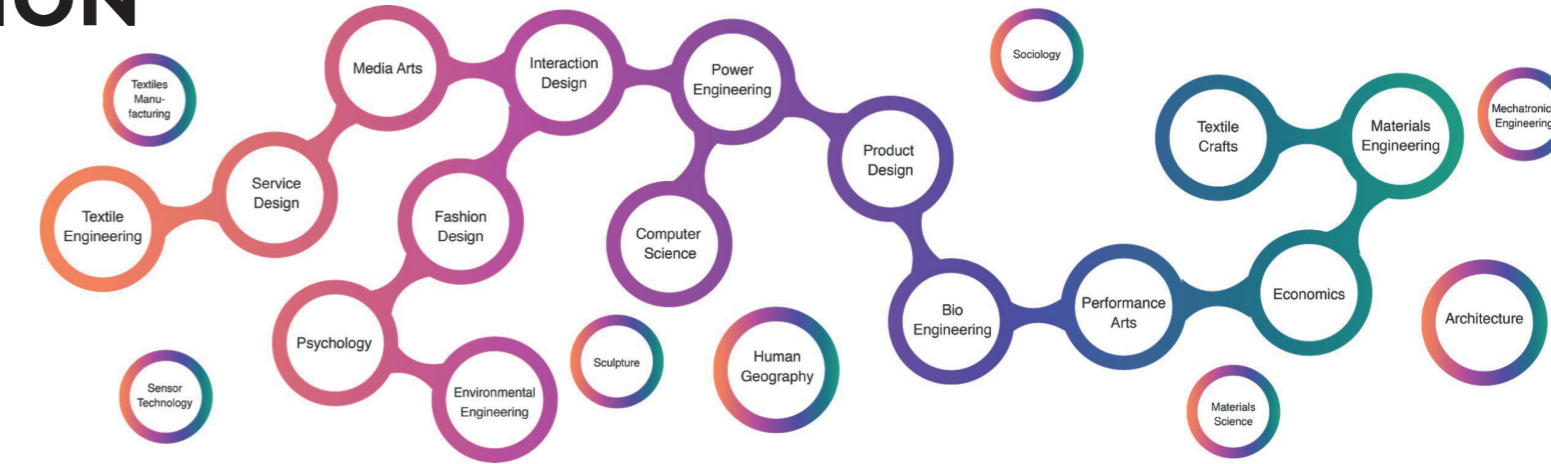
S+T+ARTS

STARTS PROTOTYPING

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INTRODUCTION



WEAR Sustain set out to create a pan-European network, to aid the development of emerging projects and provide resources for wearable technology, smart textile and e-textiles sectors, in order to create a more ethical and sustainable collaborative design, development, distribution process, and ecosystem for a more responsible future.

In doing so, we have informed and inspired designers and developers to adopt ethical and sustainable workflows in their practices and throughout the life cycle of their products.

WEAR Sustain has provided these teams with mentorship, services and support from industry experts and hubs for collaborative working, providing opportunities for all to contribute to developing a strong sustainable strategy and online Toolkit for future teams, packed with the resources necessary to exchange knowledge, support them and maintain the ethical and sustainable wearables ecosystem for the future.

Alongside our funded teams is a larger network ecosystem of creatives, technology experts, business leaders, academics and other stakeholders who offer novel, sustainable and ethical ways of working within the wearables, smart and e-textiles sectors.

We could not have achieved such profound success without the help of a vast number of experts, mentors, hub leaders and other service providers, who gave unrivalled and dedicated support to the teams, helped to raise awareness, and promote this new and promising movement of more socially and environmentally beneficial practices in the fashion, textiles and technology sectors.

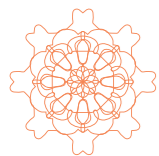
WEAR Sustain aims to become a recognised and paradigm shifting framework for future novel products and projects, with essential ethical and sustainable approaches to innovation within the fashion and textiles, materials science, smart, e-textile, and technology sectors, leaving a lasting mark and making the world a better place for society and consumers.

Funded by the Horizon 2020 Work Programme 2016-17, ICT 36 Innovation Action, under the umbrella of the DG-Connect STARTS initiative to foster new innovation at the nexus of 'Science, Technology and the Arts', this ICT project, now called *STARTS Prototyping* by the commission, set out to enable creative people and technologists to work together to produce unconventional and compelling new products, taking advantage of the existing structures involved in the education, research and economic support of the creative industries. Our strong emphasis on ethical and sustainable materials sourcing, design, development, workforce and manufacturing, aimed to tackle issues of data privacy, collection and use, as well as labour practices within the fashion, textiles and technology industries, addressing the huge environmental impact of these sectors.

We have provided knowledge exchange opportunities and encouraged cross-sector and cross-border collaboration, funding a total of 46 exciting and diverse projects from across Europe.

The WEAR Sustain project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 732098. The sole responsibility of this publication lies with the WEAR Sustain Consortium. The European Commission is not responsible for any use that may be made of the information contained therein.





WEAR PARTNER CONSORTIUM



www.imec-int.com/en/home

imec is the world-leading research and innovation hub in nanoelectronics and digital technologies. The combination of our widely acclaimed leadership in microchip technology and profound software and ICT expertise is what makes us unique. By leveraging our world-class infrastructure and local and global ecosystem of partners across a multitude of industries, we create groundbreaking innovation in application domains such as healthcare, smart cities and mobility, logistics and manufacturing, and energy.

As a trusted partner for companies, start-ups and universities we bring together close to 3,500 brilliant minds from over 70 nationalities. imec is headquartered in Leuven, Belgium and also has distributed R&D groups at a number of Flemish universities, in the Netherlands, Taiwan, USA, China, and offices in India and Japan. In 2015, imec's revenue (P&L) totalled 415 million euro and of iMinds which is integrated in imec as of September 21, 2016 52 million euro.

imec Team: Heritiana Ranaivoson (PI) is Senior Researcher and Project Leader at imec-SMIT-Vrije Universiteit Brussel (Belgium) since 2010. He is the Project Coordinator for WEAR Sustain. Johnny Waterschoot, Project Manager.



www.uca.ac.uk

University College for the Creative Arts (UCA) is a specialist university that has created a unique community for students, where like-minded people can share in the creative process and inspire one another. Oscar-winning filmmakers, world-renowned fashion designers, television presenters, celebrity jewellers and Turner Prize nominees are just some of the high-profile graduates from UCA.

UCA's Centre for Sustainable Design (CfSD) has built world-class knowledge and expertise of sustainable innovation and product sustainability. The Centre researches, develops and disseminates present and future sustainability impacts and solutions related to innovation, products, technologies, services and systems through projects, training, events, networks and information.

UCA Team: Dr CC Baker, BA, MASC, PhD, Reader in Interface and Interaction, School of Communication Design at UCA. Dr Baker was the initiator and a principle investigator (PI) of WEAR Sustain. She is also participant partner in a new follow-on EU project called STARTS Ecosystem starting in 2019.

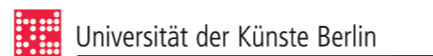
Lucy Bunnell is an experienced Project Manager with an Organisational Psychology and Events Management background. She has worked on WEAR Sustain in a project management and research capacity.



datascouts.eu

DataScouts is an Ecosystem Intelligence Platform that helps to build expert communities. The platform allows to map all the relevant actors in an ecosystem, to allow them to present themselves, to share knowledge and to contribute to building a vibrant network. The platform automatically enriches missing company information and collects relevant social media feeds and news streams from the internet. The collected data is aggregated and translated into relevant insights, trends and innovations. DataScouts facilitates building collective intelligence, based upon a common knowledge base and a shared network of connected organizations.

DataScouts Team: Ingrid Willems (PI) is the co-founder & Managing Director of We Connect Data, the owner & CEO of WFMC, as well as Board member of Floré. She is the data scientist behind the WEAR network. The team includes Jan Vansteenlandt, Emeline Martin and Natan De Bie.



www.udk-berlin.de/startseite

Universität der Künste Berlin (Berlin University of the Arts) is one of the biggest, most diversified and traditional universities of the arts in the world. The teaching offered at the colleges of Fine Arts, Architecture, Media and Design, Music, and Performing Arts, as well as at the Central Institute for Continuing Education/ Berlin Career College encompasses the full spectrum of the arts and related academic studies in more than 70 courses. Having the right to confer doctorates and postdoctoral qualifications, Berlin University of the Arts is also one of the few art colleges in Germany with full university status.

UdK Team: Berit Greinke (PI) is a junior professor in Wearable Computing at UdK and Einstein Center Digital Future (ECDF). Florian Sametinger (PI) is design researcher, lecturer and project lead at the Design Research Lab, UdK, his PhD topic is Design for Sustainability.

Supported by: James Weaver and Sankun Liu, QMUL School of Electronic Engineering and Computer Science.



www.qmul.ac.uk

Queen Mary University of London (QMUL) is one of 24 leading UK universities represented by the Russell Group, and with 25,332 students, 4,000 staff and an annual turnover of £400m, we are one of the biggest University of London colleges. The results of the most recent national assessment of research – the Research Excellence Framework (REF 2014) – have confirmed our place in the very top group of research-led universities in the UK. Overall we were ranked 9th in the UK among multi-faculty universities and 5th in the UK for research outputs, and QMUL hosts the multi-million pound Media and Arts Technology Centre which trains researchers in the skills needed for the Creative Economy.

QMUL Team: Dr Nick Bryan-Kinns (PI) is Reader in Interaction Design and Director of the Media and Arts Technology Centre. Rachel Lasebikan is Senior Research & Innovation Manager for WEAR. Her experience is in fashion, creative and technology industries collaboration for a stronger creative economy. She is also an experienced marketing director.



www.digitalspaces.info

Digital Spaces Living Lab is one of the leading living labs in Europe. DSLL was founded in 2008 in Sofia, Bulgaria. In the last 10 years, it has conducted many technology validation trials in the fields of smart cities, mobile apps, wearables, games, digital media, etc. It has won several European Living Lab competitions and has participated in many European research and innovation projects. For the last 8 years DSLL has been one of the special partners of the European Satellite Navigation Competition (<https://www.esnc.eu>), supporting the winner and finalists of the annual global GNSS Living Lab Prize, including companies and projects like Safety Truck (UK), PPP WizLite (France), GoWalk (UK), TagStory (Norway), Ampido (Germany), SellNews (Germany), Vamos (Germany), Geo-Coupon (Taiwan), etc. In the last 2 years DSLL has been one of the key consortium partners in the WEAR Sustain (<https://wearsustain.eu/>) €3M project, funded by the European Commission Horizon 2020 research and innovation initiative, to support the wearables and smart textiles industry in Europe. Wear Sustain has selected, funded and incubated 46 projects in two Open Calls (<https://wearsustain.eu/awardees/>). DSLL offers Living Lab technology validation trials with real users to companies developing novel wearable devices and technologies.

Dr Stavri Nikolov (PI) is the Founding Director of the Digital Spaces Living Lab (DSLL) in Sofia, Bulgaria. He also co-founder and Head of Research of Attentive Displays Ltd (www.attentivedisplays.com) and co-founder and Research Director of Imagga Ltd (www.imagga.com).



www.blumine.it/it/Default.aspx

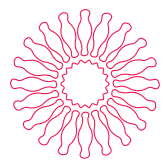
Blumine Srl was founded in 2010 in Milan, Italy as a pioneering consultancy to fashion, design and textile companies in Ethical Sustainability, Sustainable Innovation, Circular Economy at the intersection of economics, design, production and communication, fostering ethical social innovation and new opportunities for the creation of added value to SME.

Today, bridging Sustainability with Digital Technologies, Blumine is engaged in advancing the culture of Sustainability. Blumine provides state of art skills in sustainability audits, tailoring sustainability long term goals and short term action plans, targets and KPI for projects; success, including supplier-customer dialogue and cooperation. Blumine contribute to a competitive media landscape favourable to Sustainability and social innovation in the fashion industries, the market, the media and society with its digital platforms sustainability-lab.net and change-makers.

it as well as publishing reports, books, articles and participate to events in cooperation with the *Politecnico di Milano* and *Catholic University of the Sacred Heart, Milan* and textiles and fashion brands and top fashion trade fairs all over Europe.

“Sustainability has many meanings. Blumine deals with economics, production, communication and consumer culture to enable sustainability in the fashion, design and textile industries. Companies need to review their production, communication and financial strategies in a sustainable way. Few have within them the experience to do it. Blumine multidisciplinary team offers them skills for the development of new products, redesign of organizational models, implementation of communication projects that focus on the ability to reduce environmental impact, to generate lasting growth, guarantee social conditions to improve safety, health and better living conditions”.

Blumine Team: Giannino Malossi (PI) is a cultural operator in the creative and cultural industries, focussed on communication and media as it intersects with finance and economics." With Blumine he is focussed on sustainability and the textiles industries in Italy. Marco Ricchetti a senior editor and member of the board at <https://www.sustainability-lab.net> and finance contact for WEAR.



THE STORY OF WEAR

WEAR SUSTAIN:

“We consume our earth’s natural resources to create and make, with an impact on our environment and upon those who have played a part in producing and supplying the raw materials that we use each and every day. Artists and creatives are communicators and can highlight environmental, social and economic themes in our work... as designers, creators and makers we can play an important role in informing and inspiring others to see the world differently and act more sustainably.”

Professor Martin Charter, Director and Scott Keiller, Co-ordinator, Sustainable Innovation, The Centre for Sustainable Design®, UCA

CONTEXT OF WEAR SUSTAIN

At the core of wearables businesses are the devices and applications that collect a growing amount of personal body data, often without users’ awareness or even consent. This wearable technology fervour raises important ethical issues concerning the lack of privacy and corporate ownership of personal data for consumerist agendas.

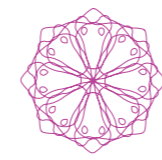
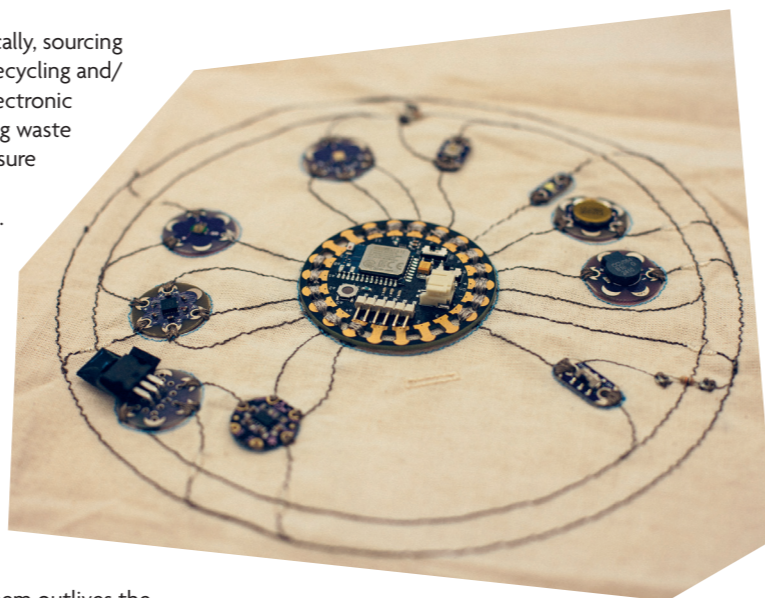
Technology is becoming more personal, less visible, and yet more connected and ubiquitous. Numerous technology companies and start-ups are working to make the next big wearable device or application for body data tracking.

Aside from privacy issues, there are significant ethical issues around social, environmental, labour, and supply-chains, in fashion, textiles and technology industries. It is timely and urgent that the use and deployment of the devices is changed in ethical and sustainable ways, and that users become more aware and educated about the critical side of the design of wearable technologies, electronic textiles and smart fashion, and their environmental impacts. From a business point of view, improving awareness of privacy issues may also encourage consumers to use these trusted products more often.

WEAR Sustain is now contributing to the European Commission’s sustainable strategy, which includes ethical employment of labour, workshops for

embedding electronics ethically, sourcing locally made components, recycling and/or upcycling of both non-electronic and electronic parts, avoiding waste by fabricating made-to-measure wearables, and economical application of new materials. Strategies already developed for the end of wearables’ lives - including recycling or disposal, and the advocacy for the use of modular systems that not only ensure that the garments and devices can be worn for longer and be washed, but also that technology and carrier material can be separated once one of them outlives the other—were the starting point for WEAR Sustain project and funded teams to address and surpass.

Photo: David Gauffin



VISION AND VALUES

WEAR Sustain began with the meetup group *e-stitches*, run by Camille Baker and Melissa Coleman in London, and a desire to spread the network wider and further. The consortium partners bring a deep motivation and passion to influence and change industry practices.

We all want to stop harming the environment, stop surreptitiously surveilling on customers and users, and contribute to better ways of working for the benefit of the planet and society. Change in life cycle product development practices is necessary, especially within the electronics industry and supply-chains, but also in the fashion and textiles industries and how they make their products. What drives us in WEAR Sustain, is to contribute to product innovation with purpose and soul, to build a network of like-minded pioneers and to start a movement of change before it’s too late for Earth.

WEAR Sustain has its lineage in previous EU projects of the partners. Camille Baker and Rachel Lasebikan worked together on *FET-Art / ICT & Art Connect*, which focussed on bringing artists and technologists together to make new art-based technological innovations. This was followed by the *ICT & Art Connect Study*, which Baker was an advisor for and iMinds a partner (now merged with Brussels-based imec). Ingrid Willems and Heritiana Ranaivoson worked on *CreatiFI* and related *FIWARE*

projects, enabling digital transformation with CCI engaging creative urban ecosystems as digital launchpads, which had iMinds as coordinator. Digital Spaces Living Lab is one of the leading labs in Europe, performing validation trials of wearable technologies and products, some of them in the framework of EU projects like GEPAS, the E-GNSS Accelerator and eCultValue. The Creative Ring launched as a sustainability action from *CreatiFI* and other associated EU projects, and the WEAR Sustain consortium worked closely with them to disseminate and support our activities across Europe. Partners also brought their local networks and other associated past projects into the fore, to develop the large pan-European ecosystem we now see today.

ORIGINAL AIMS OF WEAR SUSTAIN

- Develop a sustainable European network of stakeholders and hubs, to connect and push the boundaries in the design and development of sustainable and ethical wearables, electronic and smart textiles;
- Encourage cross-border and cross-sector collaboration between creative people and technology developers to design and develop wearables, electronic and smart textiles;
- Develop a framework within which future prototypes can be made that will become the next generation of what ethical and aesthetic wearables, electronic and smart textiles could and should be;

- Lead the emergence of innovative approaches to design, production, manufacturing and business models for wearable technologies;
- Make citizens, entrepreneurs and other stakeholders more aware of the ethical and aesthetic issues in making and use of wearable technologies.

e-stitches carries on the WEAR Sustain legacy, as it grows from one location in London, to four locations in London, Bristol, Berlin, and Limerick, with the promise of a New York group. Many members involved in WEAR Sustain projects as mentors, hub leaders, experts, and project members will also carry on our good work. Related to WEAR Sustain and starting in December 2018 is the EU funded REFREAM project. In addition,

other projects funded by the EU DG-Connect department, under the *STARTS* initiative, are the *STARTS Prize* and the *STARTS Residencies* (also called *VERTIGO*), with the soon-to-follow *STARTS Lighthouse Pilots* and *STARTS-ecosystem*.

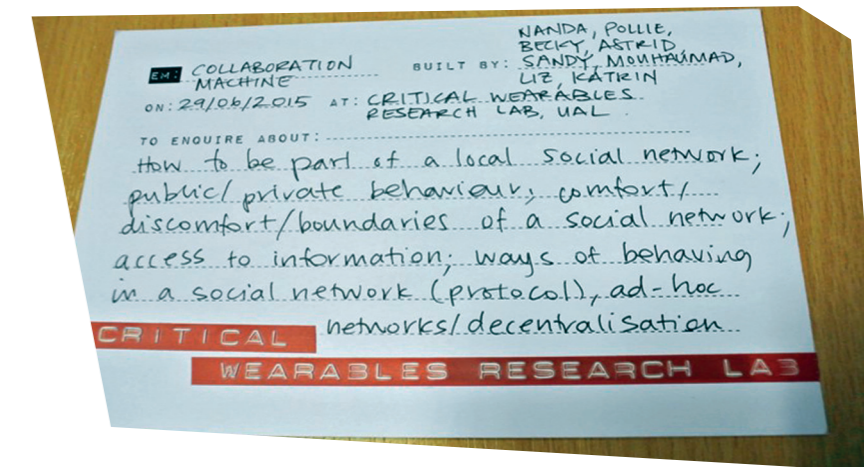
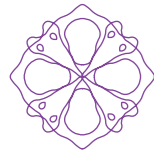


Photo: Rachel Lasebikan, Critical Wearables Research Lab, Creativeworks London.



KNOWLEDGE EXCHANGE, INSIGHTS AND OUTCOMES

WEAR Sustain designed its programme to foster cross-border, cross-sector interaction, knowledge exchange and co-creation. Via a series of events, two competition rounds, online network mapping, as well as webinars and surveys, the WEAR team has harnessed the insights needed for the project's ethics and sustainability recommendations.

The project consortium partners took on geographic responsibilities, based on their physical locations and contacts, to build local networks and to support promotion, communication, and dissemination. The partners have grown audiences across the EU, engaged local project hubs and partners to create awareness and understanding in local languages and ensured that a good balance of European regions have been represented in the project.

WEAR SUSTAIN EVENTS

Matchmaking and knowledge exchange events were organised at the start of the project to trigger new collaborations between creative people and technology developers, to kick off a Europe-wide structured dialogue on the ethics and sustainability of wearables, smart and e-textiles, privacy and corporate data capture, and to inform stakeholders of upcoming competition Open Calls.

COMPETITION OPEN CALLS EVENTS:

Over each competition period, WEAR Sustain:

- Engaged artists, designers, technologists and engineers across the EU to apply to the competitions
- Encouraged key players in the ecosystem to participate in local matchmaking, networking and knowledge exchange events
- Engaged potential mentors, hub leaders and experts to get involved directly with selected teams
- Promoted the online network's facility to foster new partnerships

The events took various formats, such as hackathons, symposia, showcases and consultations, with presentations by experts

in their fields and a discussion format integrated into every local event.

Each event clearly outlined the sustainability and ethical challenges, issues, opportunities and successes faced within the wearables, smart or e-textile sectors, as well as arts-tech collaboration, challenges and opportunities. Interdisciplinary teams and their methods of collaboration were discussed, critically looking at perceptions of difference between 'creatives' and 'technologists', and harnessing strategies and tools for creative collaboration through existing research and observation of projects taking place as part of WEAR Sustain. There were clear acknowledgements of hard work needed to aid interdisciplinary collaboration.

WEAR EVENT LOCALITIES

OPEN CALL 1:

- Sofia, Bulgaria, launch/hackathon event, 30th March 2017, Smart Fab Lab
- Barcelona, Spain, support event, 20-21st April 2017, Barcelona FabLab
- London, UK, official launch event, 3rd May 2017, Digital Catapult
- Brussels, Belgium, support event, 17th May 2017, MAD Brussels

- Eindhoven, Netherlands, support event, 18-19th May 2017, Natlab

OPEN CALL 2:

- Aarhus, Denmark, launch/support event, 2nd November 2017, Creativity World Forum, Aarhus University
- Athens, Greece, launch/support event, 16th November 2017, B&M Theocharakis Foundation for the Fine Arts and Music
- Paris, France, support event, 22nd November 2017, ENSAD Lab, Paris
- Milan, Italy, support event, 30th November 2017, BASE Milano
- Guimaraes, Portugal, support event, 6-7th December 2017, IDEGUI - Instituto de Design de Guimarães

WEAR PARTICIPATION IN KEY EXTERNAL EVENTS INCLUDES:

- Berlin Wearit Festival 2017
- Milano Digital Week 2017
- Digital Futures, E-Stitches 2017
- WeAreTechWomen Conference 2017

- Mikser Festival Belgrade 2017
- Vienna Maker Faire 2017
- Creative Ring Eindhoven 3rd Innovation Clinic 2017
- Wearable Technology Show 2017 & 2018
- Fashion: Paradigm Shift 2017
- TechStyle: The World of Wearables 2017
- WEBIT Festival Europe 2018
- Hack Belgium 2018
- FABelgrade 2018
- WEBIT Festival 2018
- FutureFest 2018
- Torino Fashion Week 2018
- Digital Assembly 2018
- Ars Electronica 2017 & 2018
- Global Fashion Conference 2018

WEBINARS

Harnessing the expertise of experts in their fields, WEAR Sustain organised a number of webinars aimed at those who were unable to participate at local events. Webinars targeted potential applicants, funded teams and a wide variety of experts willing to support the exchange of knowledge, to improve ethics and sustainability in the wearables and e-textile sectors. The webinars were recorded, edited and made available on the project's YouTube account. These will also be available and utilised in the Sustainability Toolkit resources in the new Network Platform at the end of the WEAR Sustain project in December.

Visit WEAR Sustain on www.YouTube.com

PRESENTATIONS

Visit WEAR Sustain on www.slideshare.net

PUBLISHED MATERIAL

The WEAR Sustain consortium have been involved in conferences and presented papers at the following:

Conference paper – James Weaver, Creative Collaborations Between Artists and Technologists, August 2017, Inter/sections—Ethics and Politics in Media and Arts Technology, September 2017

VSMM workshop – WEAR Sustain Open Call 2 – DRHA Data Ache, VSMM September 2017 – The 23rd International Conference on Virtual Systems & Multimedia

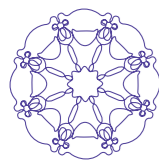
Journal article – Baker, CC., Bryan-Kinns, N., Greike, B., Ranaivoson, H., WEAR: Wearable technologists Engage with Artists for Responsible innovation: Processes and Progress, 'Virtual Creativity (VCR)' Intellect Press Vol 8 (1) December 2018 available online (in December 2018) <https://www.intellectbooks.co.uk/journals/view-journal.id=179>

Conference paper – Nick Bryan-Kinns, QMUL, Camille Baker, UCA, Berit Greinke, UDK, Heritiana Ranaivoson, imec, Rachel Lasebikan, QMUL, Yongmeng Wu, QMUL, and Sankun Liu, QMUL. Wear Sustain Network: Ethical and Sustainable Technology Innovation in Wearables and Etextiles, Global Fashion Conference 2018, October 2018: <http://gfc-conference.eu>

WEAR Sustain - Sustainability Strategy Toolkit Development, Dr Berit Greinke, Design Research Lab, Universität der Künste Berlin, IEEE GEM Berit Aug 2018 www.drlab.org

Photos: WEAR Sustain London event, Digital Catapult, May 2017





WEAR SUSTAIN NETWORK

THE DEVELOPMENT OF A PAN-EUROPEAN WEARABLES PLATFORM

Wear Sustain invested in developing a pan-European network of e-pioneers in ethical and sustainable wearable tech. The online platform, developed and hosted by DataScoutsTM, was designed to support the emerging ecosystem in creating and developing sustainable and ethical products and services across Europe.

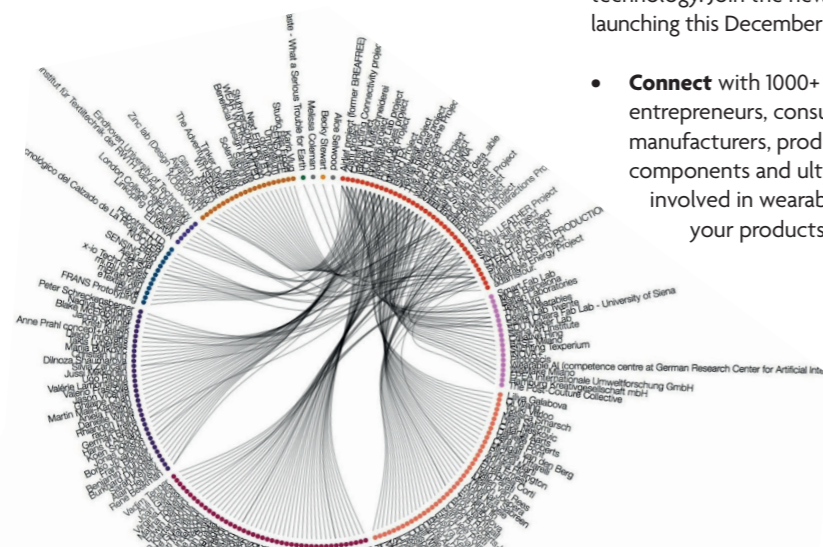
The current WEAR Sustain online network has brought together the funded teams, experts and mentors, hubs, other stakeholders as well as services and support businesses involved in sourcing, experimentation, design, prototyping, manufacturing and promoting sustainable and ethical business models across Europe.

The network enables all industry players to:

- > CONNECT
- > COLLABORATE
- > SHARE INFORMATION
- > INTEGRATE SUSTAINABILITY AND ETHICS INTO PRACTICE

The platform is endorsed by 40+ ambassadors; expert hubs, corporates and investors ready to incubate and accelerate wearable technology innovation and to promote ethics and sustainability, as a core enabler for the future.

The WEAR ecosystem is developed on DataScoutsTM, a cloud-based platform developed and commercialised by Belgian start-up We Connect Data. The platform allows communities to map and monitor the heartbeat of their ecosystem by systematically characterising organisations, exploring their community activity, and spotting meaningful trends to discover what may be hidden patterns. DataScouts is used by companies across Europe for Market Intelligence, Competitive Intelligence and Ecosystem Intelligence. The WEAR platform also includes a network of maker spaces, fab labs, creative hubs, living labs, accelerators, incubators and investors, that are actively working in the field



of wearables and e-textiles, and can support and provide services to new start-ups and teams in these areas.

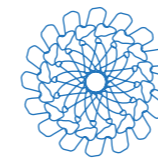
The WEAR Sustain online network will evolve into the WEAR Sustain Platform in December 2018, comprising an expert community of e-pioneers in wearable tech, including many of the most innovative companies in the field. The platform will provide an opportunity to fully exploit the potential of e-textile and wearable technology, the network of awarded teams, hubs, mentors and the learnings from WEAR Sustain. It will enable cross-disciplinary and cross-sectoral collaboration to drive a global shift towards a more sustainable and ethical wearables, e-textiles and smart textiles industry.

The platform will provide best practices, curated content and access to a wide range of diverse partners all along the value chain of wearable technology. Join the new WEAR Sustain Platform, launching this December to:

- **Connect** with 1000+ designers, researchers, entrepreneurs, consultants, textile manufacturers, producers of electronic components and ultimately consumers involved in wearable technology and offer your products and services;

- **Be present on the leading wearables and e-textiles platform in Europe;**
- **Get access to information** about the stakeholders in the ecosystem, technology trends, news and events, as well as innovations, research findings, design models and methods of adoption within the wearable technology, smart and e-textiles network, as well as living lab technology validation trials and user communities;
- **Engage in open dialogue, collaborative research and innovation** with peers, exploring and co-creating novel approaches as well as controversial ideas to solving common problems, as they might turn out to be the next disruptive innovation in wearable technology;
- **Contribute to and make use of the Sustainability Toolkit** providing recommendations, access to curated information and expert knowledge;
- **Act as an expert** in ethical and sustainable innovation, business or technical mentor to teams;
- **Demonstrate and promote** your expertise, activities and sell your consumable, ethical & sustainable fashion and wearables.

Join at www.wearsustain.eu



A SUSTAINABILITY STRATEGY AND TOOLKIT FOR THE FUTURE

The goal of WEAR Sustain is to develop best practices for enabling, facilitating, and growing our Europe-wide wearable technology, smart and electronic textiles network, for collaborations and innovations between artists, designers, technologists and engineers working on ethical and sustainable solutions and technologies for a better future. It has driven a movement toward the evolution of wearables and e-textiles that are more ethical, critical and aesthetic, and ultimately more sustainable for future generations.

Embedded in the WEAR Sustain online network, the Sustainability Strategy Toolkit will provide guidelines and best practice for design, materials circularity, and product life cycle development. This will contribute to future innovation, sourcing, development, manufacturing, waste management,

ethical labour and business practices, and interdisciplinary collaboration within the technology and creative industries, for more critical, aesthetic, sustainable wearable technology, smart textiles and e-textiles, while addressing ethical methods to safeguard data privacy.

Knowledge and insights gleaned during the WEAR Sustain project have been synthesised into the Sustainability Strategy Toolkit in the form of specific strategies, training, services and resources, experts to contact and actions required to facilitate the evolution of ethical and sustainable wearable technology, e-textiles and smart materials. It aims to enable new partnerships and collaborations with the support of WEAR Sustain advocacy hubs, within the sectors of smart fashion, smart textiles and e-textiles, technical fabrics, wearables and other 'onbody' and 'inbody' electronics and engineering.

The Toolkit draws from the online WEAR Sustain Network, made up of an ecosystem of artists and designers, technologists, experts, mentors, hubs, service providers, and other industry players. It will integrate with the network to become a comprehensive platform supporting future citizens, artists, designers, technologists, entrepreneurs, and other industry stakeholders, in making more ethical and sustainable choices. Informed choices will be made based on the resources of the network as well as a guided self-assessment tool, which will help to identify potential areas of improvement in the development process. Furthermore, the self-

assessment will help to determine how to either improve an already sustainable and ethical practice, adopt or even develop new future practices in wearable technologies, smart textiles and e-textiles, including full life cycle and end-of-life approaches to production, taking into account impact on the present and future of society and the planet.

THE TOOLKIT

Our Sustainability Toolkit aims to provide resources and advice to facilitate future collaborations between SMEs, artists and designers, and technologists in the wearable technology and smart textile sectors for novel and beneficial innovations. It will guide these innovators with ethical and sustainable design research, design, sourcing, development and manufacturing services for wearables, smart and e-textiles development while addressing the following three categories:

1. Innovation and Collaboration:

- Ethical and sustainable business models, which also use or exchange and share data ethically;
- Creating a digital ecosystem around ethical and sustainability design and development for wearables, smart or electronic textile innovations;
- Supporting future artists and designers with technologists and engineers, and industry collaboration;

- Developing collaborative communities and local ecosystems, and the supply chain in this niche field.

2. Data use: Ethical Private Data Storage, Collection and Non-Collection:

- Providing new models for limited or no data capture or processing from wearable technologies, especially users' personal data, or anonymising and relinquishing ownership of this data by technology manufacturers and service providers.

3. Creating positive environmental, economic and social impacts within the electronic, textiles and fashion industries and on society:

- Tackling and improving ethical and environmental issues that include: poor labour practices and working conditions within manufacturing, mineral sourcing, supply chain and end of life considerations;
- Creating awareness for the environmental, economic and social impact of wearable technology innovation along the whole life cycle, right through to end of life and waste management for products.

The WEAR Sustainability Strategy Toolkit, will be available at the end of December 2018 on the WEAR Sustain Platform.

FUTURE AND NEW DIRECTIONS AFTER WEAR SUSTAIN

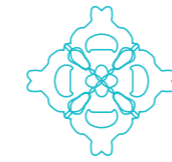
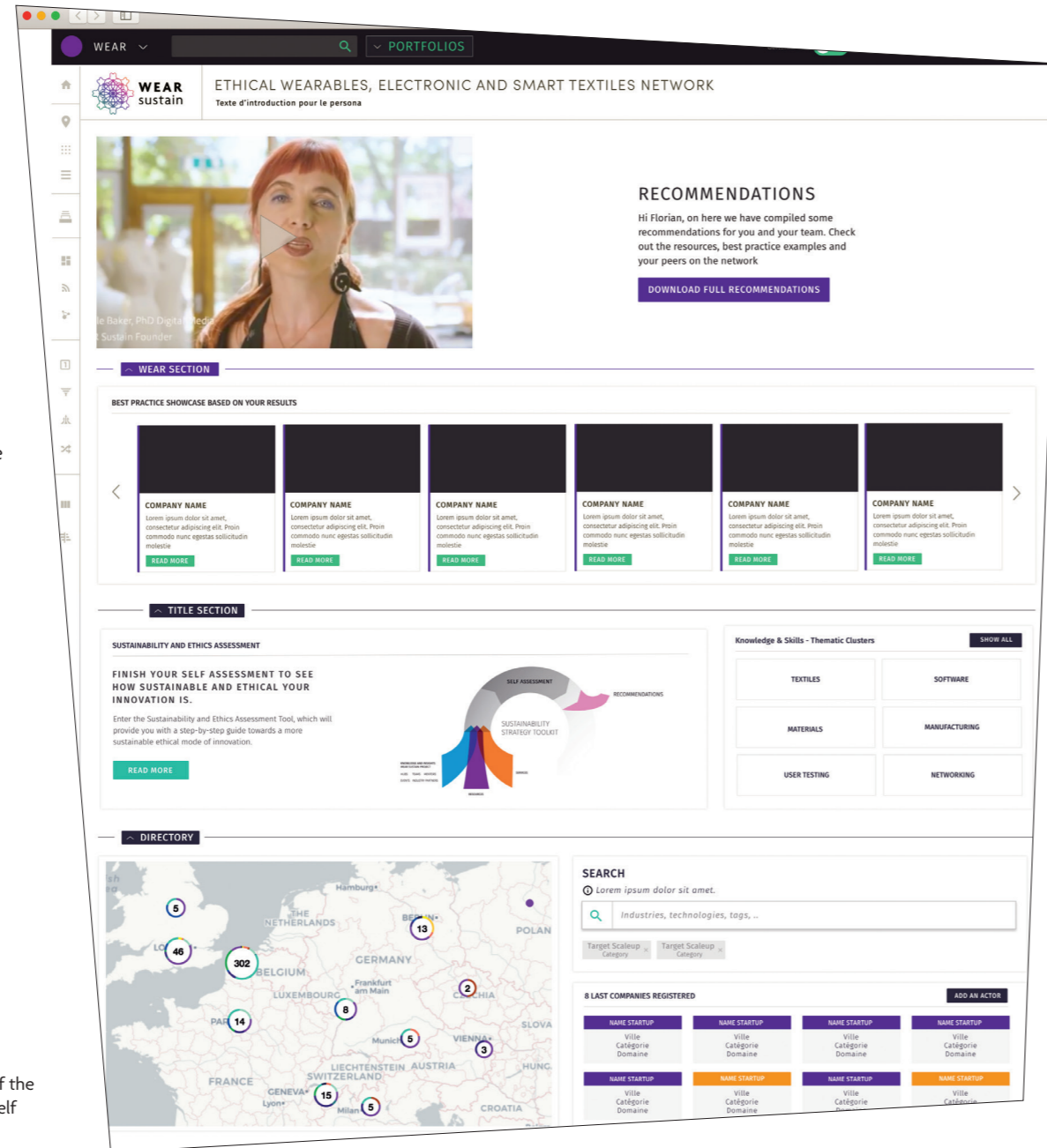
Throughout the WEAR Sustain project the WEAR Consortium has met individuals, businesses and organisations that are passionate about ethical and sustainable research, design, sourcing, development and manufacturing of wearables, and smart textiles and e-textiles. The WEAR Consortium has identified within this emerging ecosystem a strong willingness to collaborate, to exchange information and to share knowledge. New teams are looking for best practices, support and mentorship along their innovation journey. WEAR Sustain will continue facilitating the knowledge exchange within the WEAR expert community.

Our future directions include:

- Create a new business leveraging the *WEAR Sustain Platform*, run by some of our consortium partners, in order to expand and grow the platform further after the end of the project;
- Create a consultancy business with our consortium partners, core experts, mentors and hub leaders, as part of the Sustainability Strategy – to train stakeholders and future design teams, as well as to continue to present our achievements to keep the momentum going;
- Create design, prototyping and living lab validation businesses from our consortium partners and hubs;
- Users will test the Toolkit with our most engaged hub leaders, mentors, current teams and expert stakeholders in the network;

- Introduce current funded teams to investors, angels and other funders to get them to the next level;
- Share the Sustainability Strategy and Toolkit with the next STARTS project: STARTS Ecosystem, which starts in spring 2019, to enable not only wearables and e-textiles art/design and tech teams, but other art-tech projects in the STARTS family to become more ethical and sustainable in their art-tech innovation practices;
- Eventually create or contribute to an accreditation system for future designers and development teams;
- Spreading the word and Sustainability Strategy and Toolkit, to help the next generation.

Image: Developing the next iteration of the *WEAR Sustain Platform*, housing the Self Assessment, Toolkit and Network.



SUCCESSFUL RESULTS

WEAR Sustain's primary legacy focus has been to develop a robust set of tools and resources that will enable future design and technology teams, SME's, researchers, educators and change-makers to collaborate and integrate ethics and sustainability into future business and product development practices.

To create these resources, the consortium partners managed a series of complex activities that together, would garner the cross-border, cross sector insights needed to develop a sustainability strategy and toolkit for the future.

The project's successes towards this end goal include:

Creation of a pan-European ecosystem. An online network was launched by the second month of the project, to help grow communities of creatives, technologists, engineers, hubs, experts and mentors involved in collaboration, exchange of knowledge and contribution to insights for the creation of ethical and sustainable wearables, e-textile and smart textile innovations. Identified hot spots were in London, Berlin, Milan, Sofia and Eindhoven.

The consortium engaged over 1000 regional, national and international individuals and agencies

active in education, research, industry and economic support of the wearables, smart and e-textile industries, including start-ups, private and public funds, investors, corporates, incubators and accelerators. All these industry actors participated in WEAR Sustain events and symposia, and at external events and meetups throughout Europe. In addition, all actors were encouraged to engage with each other online, via the WEAR Sustain Network, to continue exchanging knowledge and skills across borders and to help create an ecosystem for the future.

Facilitating €2.4m of creative and technology collaboration and sustainable innovation funding, across two competition open calls, resulting in the engagement of over 125,000 individuals across Europe, between March 2017 and January 2018. The calls fostered 170 eligible arts and technology cross-sector, cross-border team formations. A project evaluation process and assessment criteria, developed by the WEAR Sustain consortium, focused on teams' creativity, excellence, business potential and project feasibility, as well as their ethical and sustainability proposals and outcomes.

Services developed by the consortium to support the project teams were grouped around:

- Design and Aesthetics*
- Ethics and Sustainability (Environmental and Social)*
- ICT/Technology*
- Prototyping*
- Data and Data Models*

- User Centred Design*
- Business, Legal and Validation Trials*
- Living Lab Experiments*
- Business and Venturing*
- Business Ethics and Sustainability*

Identification of the most vital and pressing ethics and sustainability issues facing the wearables and e-textile industry. These were put into themes for both the Open Call competitions and for discussion during knowledge exchange activities at events and online. In addition, the consortium created a glossary, to map out commonly used terms in and around wearables, smart and e-textiles, to be used as a reference for communication between all participants involved in WEAR Sustain.

Applicants were required to address one or more sustainability themes in a critical and creative way, proposing solutions to these issues. The themes were:

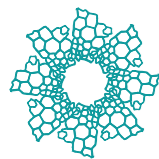
- Use, Reuse or Waste*
- Batteries and Energy Sources or Generation*
- Sourcing and Life cycle*
- Data Collection and Privacy*
- Social and Workplace*
- Body, Physiology and Somatics*

Management of 46 teams, selected and funded to develop ethical and sustainable prototypes. With our support, teams created compelling aesthetic, ethical, environmental, and sustainable solutions for wearable technology and smart or

e-textiles. Awards of €50,000 per team provided the means to jumpstart their creations towards market-readiness, and to share their best practice approaches to ethics and sustainability, as well as collaboration methodologies and outcomes. Each team was matched with a mentor and provided the expertise needed to support their work. The WEAR Consortium partners identified and mobilised over 40 advocacy hubs across Europe in the process. Some of these projects have successfully taken their prototypes to market and some are receiving venturing support from us to meet this goal.

The project's sustainable innovation process, wearables Network, and knowledge exchange activities have created a vast amount of media, publications and learning outcomes, highlighting key ethics and sustainability practices for collaborative innovation in wearables. WEAR Sustain and its 46 funded teams have also received considerable press coverage across many countries and by some of the most important wearables publications, such as *Wareable*, *Fashnerd.com* and *Forbes*. The project is listed by *Wareable* as one of the top 50 wearable tech predictions for 2018, as a "major driver" in the industry.

We are proud to be able to share the success of our project outputs that form the basis of the strategies, training and resource material, soon be launched in the beta Sustainability Strategy Toolkit, due for release in December. The Toolkit and new *WEAR Sustain Platform* will aid other teams of collaborators in replicating the ethics and sustainability outcomes across other industries and European countries.



EXPERTS, MENTORS AND HUBS

APPRECIATION

The following people and organisations have provided invaluable support as hubs, experts and mentors to both WEAR Sustain and to the 46 funded teams supported by the programme. We would also like to thank the people who contributed to our webinars, giving their time and sharing their expertise.

WEAR Sustain mentors were responsible for advising and practically supporting the selected teams during their projects. Hubs are local ambassador centres and formed the critical structure and backbone of the WEAR ecosystem in Europe. Hubs offered a local, sometimes virtual, home to a hosted team and offered specific services. We are grateful for the contribution they have made to WEAR Sustain and look forward to working with them in the future.

MAIN MENTORS

Alain Heureau, Brussels Creative and Creative Ring
Anne Prah, Concept+Design
Borko Jovanovic, Polyhedra
Burkhard Dümmler, Adidas
Catherine Delevoye, Technoport SA
Christian Linn, AWS-Institut
Daniela Zavec, Titera
Diego Colina, Innovaris
Dilnoza Shaumarova, Polybius, Women Who Tech, Unu Wearable Solutions

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Rene Beekman, Reaktiv
Rhiannon Hunt, UCA
Professor Sandy Black, London College of Fashion

Image: Registered participants in the Online Network, August 2018

Sarah Kettley, Edinburgh College of Art
Silvia Zancarli, Insituto Europeo di Design
Valerie Lamontagne, 3lectromode
Valerio Frascolla, Intel
Zoe Romano

HOME HUBS

Adidas Makerlab
Aeguana
Baltan Laboratories
Base Milano
Centrum Wiskunde & Informatie
CITILAB Cornellà-Fundació
CONENO
Creative Ring
CTCR
Designlab Twente
DFKI
Edinburgh Napier University
Elisava
EPEA
Goudza BV. Hackedby
Hamburg Kreative Gesellschaft
IMEM CNR
Imperial College London
ITA



597

Artists and Technologists

Inspire and engage and nurture new collaborations; Facilitate continuous **dialogue and collaboration**

394

Academic, creative and innovation hubs

Present **facilities and services** Highlight **expertise** in wearables, e-textiles, ethics and sustainability

1101

registered experts, organisations, policy makers

Highlight **future generation ethical- aesthetic-critical wearables**, spreading into different fields of application

network.wearsustain.eu

LCF
Makers of Barcelona (MOB)
Nine Degrees Products
Robotriks
RWTH - ITA
Santachiara
SDU MakerLab
Sensing TEX
Smart Fab Lab
Statex
Textilburg
UMBRELLIUM LIMITED
WeMake
WiredSussex
WEMAKE MILANO

OTHER SUPPORTING MENTORS AND HUBS

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Martijn van Strien, PostCouture
Maurin Donneaud
Metafas
Nora Wong
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Velarte
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Yokna, Boriana
Zinc group

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Susan Kozel, School of Arts and Culture, Malmö University



WEAR SUSTAIN FUNDED TEAMS:

CREATIVE AND TECHNOLOGY COLLABORATION –
SUSTAINABLE INNOVATION OUTCOMES



ADVENTURE INSTITUTE *



Photo: Marion Joepera



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Anthropocene is an immersive alternate reality adventure game inviting players into the unknown. The game is a 24-hour journey that gives the player a chance to reconnect to the wilderness in their own backyard and to become aware about the hottest environmental issues of their time. During the course of the game, the players acquire different survival skills and learn about the human effect on the environment while solving various clues to move forward on their adventure journey. The adventure experience is the first one of its kind to bring together alternate

reality games, professional wilderness education and immersive theatre all with a common goal of raising awareness about the human impact on the environment.

Preparations are currently underway for the launch of the pilot games.

* Call 1 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

AIRLIEF *



© Airliel Team



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Airliel is an effective and innovative air pollution mask. It is comfortable and is rather perceived as a fashion accessory than a complicated air filtering device. The 3-D-knitting technology for the front layer also allows artists and designers to customize the mask and to apply different patterns depending on the users' will.

The filters are 99% effective against PM2.5 (biggest killer in cities) and change based on how often the mask is worn and how polluted the environment is. That's why Airliel is developing a smart device and a mobile app to track when you wear the mask and how much the air is polluted. It will also be able to notify you when to change the filter and when the outdoor air is very polluted. The mask has a smart ventilator that improves the comfort of the

mask. This is a big advantage because the harder breathing, higher humidity, and fogginess are the biggest problems for all masks.

* Call 1 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

BB STUDIO



© Bushra Burge hand painted in VR with googleblocks: The Great Wave sea creature.

bb studio

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BB Studio's multidisciplinary team is currently working on a new innovative experience using in-house developed touch-visual-sound-sensory framework by enclothing the wearer in visually striking garments with proprietary inflatable haptics integrated with virtual reality. This new multi-sensory story highlights ocean pollution through untethered headsets within a multi-player haptic integrated system. This VR-haptic experience is called "GhostNet" derived from the name given to abandoned fishing nets in the sea.

BB Studio's current project is being developed sustainably and ethically following a circular design methodology using ethical materials and working with an immigrant charity sewing production house.

BENEFICIAL DESIGN INSTITUTE & WEAR WORKS *



Photo: Friederike von Wedel-Parlow

BENEFICIALWORKS

by circular business models and services. We created innovative solutions combining healthy materials with 3D-knitting and implemented electronic components for a truly circular product. Following the Cradle to Cradle principles, we analysed carefully all the wayband's components and researched innovative materials with beneficial aspects during making, using and reusing or recycling. Easy disassembly was key for inserting technical parts into the comfortable and skin-friendly outer shell made for the biosphere.

Team credits: Ruby Hawliczek, Ida Urmas, Friederike von Wedel-Parlow, Kevin Yoo

Partner credits: BFDA, EPEA, Yair Kira, Lauffenmühle, Anne Prah, Cory Robinson, TU Chemnitz

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* Call 2 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

BETA LIGHT *



Photo: Tarvo Tammeoks

BETA light

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BETAlight is a flexible light source that can be worn on the body and allows the user to adjust its shape, orientation, brightness and light temperature according to his or her needs.

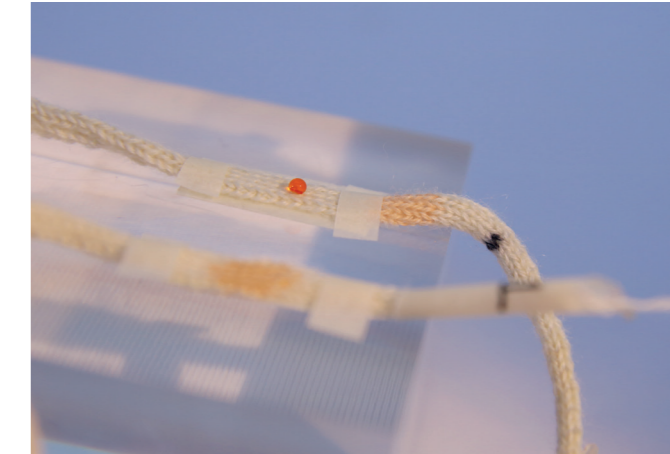
BETAlight is not only a wearable light source. It is a concept that allows the user to use light as a material to create personal illuminated spaces and individual room situations by placing it somewhere in the room or by wearing it on the body. Implemented sensors are used to turn the light on and off, to control the brightness and adjust the light temperature to switch between the different light scenarios. The fully textile circuit makes the light source completely flexible, thin and lightweight. The shell is designed of a textile monomaterial, to allow easy recycling.

The project combines the best available materials and methods after testing and considering different production and recycling methods.

BETAlight is considered to be a product in several possible markets such as personal consumer market as well as in elderly care and health.

* Call 2 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

BIOCOATILE *



© Biocoatle team

Biocoatle

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What if we could harness natural properties of biological materials to enhance the performance of our garments, without harming the environment?

Biocoatle brings together soft matter physics, biotechnology and programmable knitting to envision sustainable, chemical-free, smarter textiles.

The textile industry frequently uses a range of chemical finishes on fabrics, to add functionalities that improve products' comfort and adaptability to varied environmental conditions. These treatments often contain toxic chemicals and nano-particles that hardly degrade once dispersed in the environment and instead bioaccumulate in our bodies.

Working with a newly discovered functional protein that is biodegradable and is produced by harmless soil bacteria, Biocoatle is implementing safe alternatives to traditional toxic coatings. The protein technology physically -rather than chemically- binds to a range of natural, synthetic and conductive materials, offering a wide range of moisture-responsive properties to selected fibres. Combining these enhanced properties with biomimicry-inspired knitting construction, the team is unlocking opportunities for sustainable performance-driven textile applications in line with the growing bioeconomy.

instagram.com/biocoatle
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* Call 2 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

BIO METRICA



© Biometrica



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BioMetrica project is focused on the development of a smart t-shirt which monitors dehydration and saline loss in sports activity. The innovative technology in the smart t-shirt is based on textile biosensors that are able to collect, analyse and transmit data on the sweat amount and the concentration of salts in the sweat. During sports activity the loss of water and of salts like sodium potassium and calcium, are crucial in reducing the athletes' performances. Using our wearable device it is possible to control the dehydration and saline loss and suggest an optimal rehydration, to improve the health and the performances of the athletes.

BRAWAS



© mBrainTrain



brawas

Bogdan Mijovi,
Deputy Director

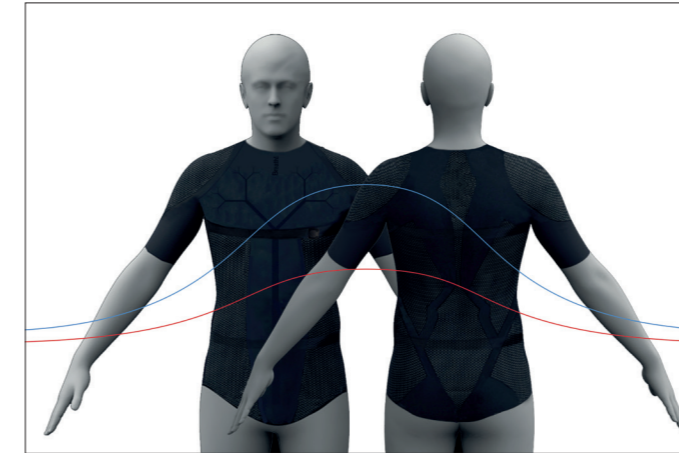
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mBrainTrain has created one of the reportedly dream devices of the wearable future:

BRAWAS - a smart headphone with a mood-based music recommender. It helps people increase productivity and decrease stress in their personal and professional life, while being seamlessly blended into their daily routine. With Brawas, we are entering the new and the fastest growing smart wearables category - hearable devices, and opening our way to the consumers world.

BREATH



© ph Milano Droni

Breath!

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Breath srl is an Italian wearable company founded on August 2017 by Paolo Belluco, Luca Orlandi, Samuele Polistina and Clara Pozzetti (<http://www.smartbreath.it>).

Breath! is a wearable smart garments collection that helps people who wear it viewing their breath and performing proper breathing during Yoga and Pilates practice and in everyday life.

Our mission is to help people to live better in everyday life.

Proper breathing is useful in obtaining and maintaining a good general health status and we believe that is a starting point to have a solid and sustainable welfare of a country.

We are designing and developing a smart and eco-friendly wearable computer system, integrated within the garment that supports users to improve breathing.

Breath! is able to acquire and analyse biometrics data of the users and the system can visualize the data on smart phone and directly over the garment as a visual instant feedback.

Comftech <http://www.comftech.it/> is our manufacture partner and Alessia Moltani supports Breath for the industrialization, manufacturing and distribution of the wearable smart garments.

BRIA



© BRIA + Matt Pril



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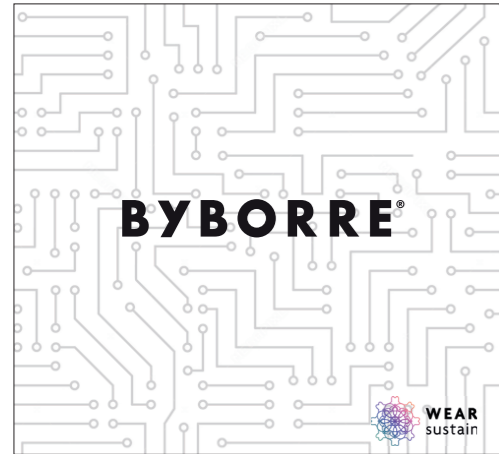
The teams at fashion-tech innovation agency BRIA and forward-looking fashion brand SABINNA have collaborated to transform a fashion capsule collection of wardrobe "staples" into new 100% biodegradable materials for use in garment packaging and shop interiors. By developing innovative processes for transforming garments into new recyclable materials, they have successfully demonstrated that without compromising on design, it is possible for brands to create commercial fashion that is circular, with the potential to avoid millions of tonnes of garment landfill waste every year.

In order to demonstrate their new developments to the fashion community, the teams at BRIA and SABINNA worked together to co-design and produce a capsule collection of garments made

from solely cotton and viscose, which can then be processed in different ways at the end of their use. The resulting fibres can be reclaimed via their new processes and recycled into other new materials similar to paper, card, plastics and even wood, which can be used for garment packaging, tags, building shop interiors and many other applications.

Their aim was to produce a capsule collection that maximises the circular aspects of production and recycling, whilst choosing the most ethical and non-toxic chemical processes to dissolve the garments and reconstitute the fibres into new usable materials. By using chemical, not mechanical recycling, these methods require less water, generate less waste, require no bleaching and have a lower carbon footprint.

BYBORRE



© Byborre

The development of garments with an interknitted chip enable customers to gain insights in the sustainable development of a garment. Moreover, the incentive to share the garment creates awareness for the post-purchase sustainability of the garment.

BYBORRE

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CLOSED LOOP *



© by-wire.net/clsaf/

Closed loop smart athleisure fashion is a new initiative based on previous work of Marina Toeters (by-wire.net) and Margreet de Kok (Holst Centre). The smart shirts continuously measures the ladies' key vital signals based on Holst Centre's advanced printed sensor technologies on flexible substrates for textile integration. The laminated sensors are truly wearable, comfortable, robust, invisible during use, washable up to 25 cycles, and designed for unobtrusive integration in conventional fashion production.

This new collection targets fashionable sporty ladies at office work and right after work, they embrace forward thinking. The closed loop lease and recycle system make it extra special.



Marina Toeters,
by-wire.net, fashion technology

Margreet de Kok,
Holst Centre, printed sensor technology

Melissa Bonvie,
Katoen en zo, fashion design

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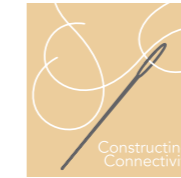
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* Call 1 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

CONSTRUCTING CONNECTIVITY *



Photography: Jessica Smarsch



Jessica Smarsch
Director

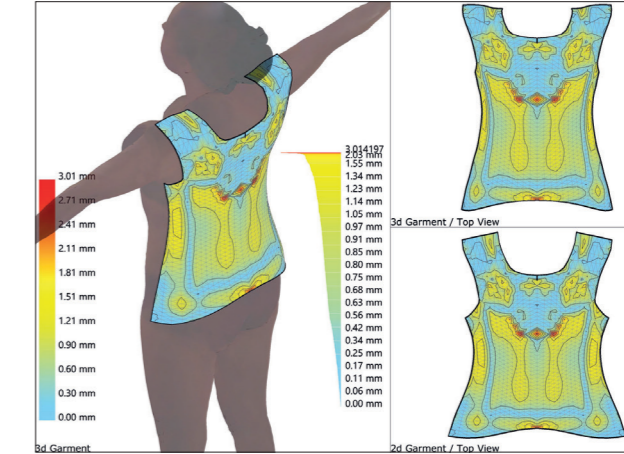
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www.jessicasmarsch.com/Constructing-Connectivity-for-Stroke-Rehabilitation

Constructing Connectivity is a person-centered stroke rehabilitation method. The system is based on the multi-sensory, mind-body process of textile making. A stroke is caused by a blockage or an eruption of blood in the brain, killing brain cells and paralysing the body. Preliminary clinical evidence demonstrates that rhythmic, multi-sensory stimulation creates more synapses between dying neurons of stroke patients than uni-sensory stimulation. Using the Constructing Connectivity app, rehabilitation exercises are combined with rhythmic sound and visual pattern-making, key aspects of textile making. The process fuses creativity with skill building, simultaneously utilizing both the right and left brain. Patient progress is quantified by the custom wearable shirt which monitors muscle use and body movement and communicates the output to the app.

* Call 1 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

Progress reports can be shared with the healthcare professionals, and patients can communicate with their therapists via the app while rehabilitating from home. After rehabilitation is complete, the patient can return their technological shirt sleeves for reuse, and receive new and improved, fashionable sleeves in return. The Constructing Connectivity mission is to treat health from a whole-person perspective, and to use design sensitivity to engage the user in the multi-sensory process and positively disrupt the standard of stroke care.

DATABLE



© Luis Fraguada

GenCloth is a 3D toolkit for the next generation of fashion designers. The toolkit includes a software plugin + tools + databases to actively support customization and rapid local production. These tools aid in designing customized pieces for clientele, speed up production timelines within local micro factories, and aid in the production of durable & sustainable designs that add value into fashion.

Globally as the fashion industry continues towards sustainability and a healthier industry cycle, we look to the next generation of designers to help with this mission. Enabling these future designers and future brands with fresh tools can help create more positive growth within the fashion industry and produce correlating positive effects for our planet, society and ourselves.



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The GenCloth process begins with each individual, shifting the focus from mass production to a customized and sustainable value chain. The GenCloth databases aid in complementing the 3D process with the open body database, sustainable textiles and notions, construction, durability and alterability methods. The basis of GenCloth research and development began in 2010 in Barcelona, Spain. GenCloth is focused on contributing to the achievement of six of the United Nations's Sustainable Development Goals for 2030.

DYNABACK



Photo: Sæunn Kjartansdóttir



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DYNABACK delivers wearable technology supporting a healthy lifestyle in everyday life. At the core, a functional base layer with an array of sensors. The base layer connects with your Smartphone and a cloud service delivering realtime and long term insights about how you move. The base layer is developed with sustainable materials and comfort to be worn throughout the day as an undergarment or by itself.

MOVE MORE The founding idea, is based on the principals of the human body, movement and core strength. In our modern society, we sometimes sacrifice movement for a sedentary lifestyle. DYNABACK measures and analyses your trunk movement continuously throughout the day and connects with a regular Smartphone. DYNABACK alerts the wearer of incorrect movement, sends

a discrete alert when sitting or standing still for a longer duration and provides long term insights and exercises educating the wearer about the need to move more and better.

MOVE BETTER While existing solutions tries to improve posture, DYNABACK works the other way and stimulates natural movement. DYNABACK helps people to counter the occasion of back pain and a sedentary lifestyle. **MOVE TOGETHER** DYNABACK is developed for everyone and for every occasion. With the DYNABACK application and community you move together with friends, family or colleagues.

EDERA SAFETY GMBH & CO KG



Photographer: Josy Jelić. Rider: Dominik Doppelhofer



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LINKING DESIGN & SCIENCE TO REVOLUTIONIZE SAFETY.

Every year people suffer spinal cord injuries due to sports, traffic and working accidents. It is clinically verified, that the majority of spinal fractures, spinal cord injuries and paraplegia are caused by overrotation.

Adamsfour. offers an escalation of back protection to a much higher level. This technology shall prevent severe spinal cord injuries and surpass the capacity of existing back protectors on the market.

Adamsfour. developed a Spinal Protector Device, by implementing Electronics into their prototypes to create Machine Learning in the development process. In order to unleash the full protective

potential, we merged electronics and design to provide real time performance data from team riders and test dummies that are looped back in the design process. The result is a cost and weight optimized "passive" design causing a significant reduction of spinal cord injuries.

The impact of what this product has to offer has been scientifically proven, in cooperation with the medical universities of Vienna and Graz. The patented technology shall offer the ability of protecting the back from the most common spinal cord injuries, often causing paraplegia starting from sports to working gear and rehabilitation products.

EMBODIED INTERACTIONS



Photos by BLESS

Stylefree offers a new way for people to have an active relationship with their garments. A scarf that transcends style, age and seasons breathes gently as it rests on your chest, and heat tingles your neck. The more you wear your scarf the more alive it becomes: its breathing pattern changes over time, heating up around your neck and adapting to how you wear and engage with it. As soon as you pick up your scarf it becomes alive, prodding you to acknowledge its presence, whether resting



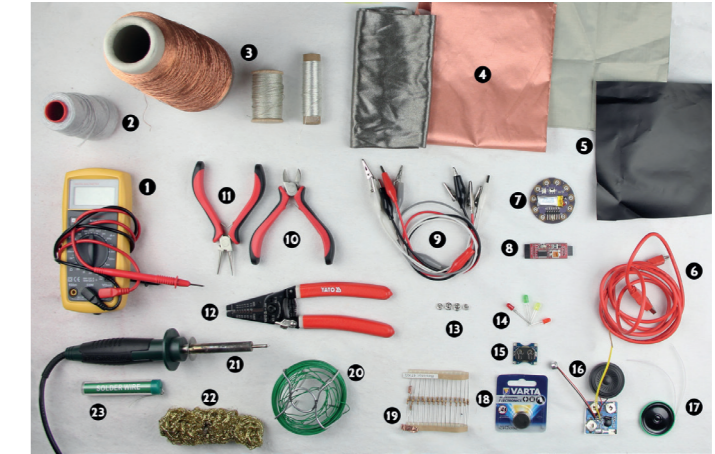
on your neck or keeping you company by your desk. Nothing on the scarf betrays its technology as all elements are seamlessly integrated into its design. Reframing what our relationship with both fashion and technology can be, Stylefree provides moments of comfort, mindfulness and awareness and asks us to take a moment to reflect, be present, and re-appropriate our relationship with technological artefacts. Stylefree is conceived and produced by Principled Design in collaboration with Bless and Umbrellium to push the boundaries between the meaningful integration of design, craft, electronics and what we consider the limits of these practices to be.

Directed by Principled Design
Garment Design by Bless
Mechanical and interaction engineered by Umbrellium
Additional hardware and EE support by Deqing Sun and Peiqi Su
E-textile development by Principled Design
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FLEXABILITY/ENABABLES *



© Anna Blumenkranz

FlexAbility is a kit prototype created from ethically and sustainability vetted components and parts facilitating the creation of made-to-measure e-textile and wearable interfaces for people with physical disabilities. To inform the design of kit sensors and accessories, FlexAbility includes its users as consultants for suggestions, feedback, and tests during our iterative design process.

This kit is open-source and is being made available to a network of designers, fabricators, and community centres through a web portal along with informational and build documents. FlexAbility is designed specifically for ease of use and enabling customization of size and shape. For example, a pressure sensitive e-textile sensor that can be cut into any size and shape by the user while retaining its functionality.



FlexAbility team:
Lara Grant (US)
Adrian Freed (US), and
Anna Blumenkranz (DE)

www.flex-ability.org

FlexAbility is an ongoing project with the goal to find people whose abilities are not currently represented in the available assistive devices on the market. We aim to provide these people with creative solutions using the advantages of e-textiles and wearable technology.

* Call 2 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

FLEXO



Photo: Gerieke ter Denge-Pluimers, DesignLab University of Twente



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FleXo – flexible exoskeleton for therapeutic use – is a bioresponsive inflatable garment that communicates healing touch with extimacy - externalized intimacy.

When introducing robot or automated interactions in healthcare, the missing component is human touch. Healing touch is a connection that communicates emotion and energy.

FleXo is a wearable soft exoskeleton to facilitate this healing therapeutic touch between a caregiver and patient. As a wearable system, FleXo offers self management and communication of mediated touch for well-being. The unique platform of emotive biomedica validates and personalizes the inflatable actuation into a new haptic language. Mediated touch is conveyed with silicone

pneumatic visual and haptic feedback. Biosensing is then employed to support and log emotional response to personalize experience.

In our research, the synergy of three fields actualized a new conceptual system for mediated touch. Co-design with autism spectrum disorder (ASD) produced self-mediation. Remote personalized touch was a result of physical therapy client caregiver scenarios. And the study of Eastern energy and self massage techniques (Chi) gave feedback on quality of pressure and the ability to convey energy. The nexus of these three research areas helps define this new paradigm of remote touch.

FUNSUN KIDS



Original photo from pixabay.com, adapted by Sandra Echeverria. Designer: Paula Canet



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Children love to spend time by playing under the sun and in water, especially during summer time. However, the risks of high solar exposure are severe for everyone, especially for children.

Funsun KIDS teaches the sun-wise behaviour to children and also to their caregivers. The core of the product is the textile bracelet, which reacts to the environmental conditions and includes the electronics sensory device. In addition, Funsun KIDS product has the app, where the monitoring results for UV Index, environmental temperature and humidity can be checked in details as well kids can learn sun-wise behaviour by taking care of the virtual animal, which requires sunscreen, sun glasses, shade etc. to stay healthy and happy through the summer day on the beach. Funsun KIDS app offers also reminders and

recommendations for the adults to increase their awareness of the sun exposure.

Modular design and sustainability are the main design drivers of Funsun KIDS. For example, the electronics device is detachable, which enables long life-time with several textile bracelets and later as well with other accessories e.g. gloves. Besides, material selections are made by taking the environmental issues into account.

FUTURE JEWELS



Photo: Katharina Vones



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FutureJewels focuses on the creation of responsive, wearable objects that create playful interactions by sensing bodily and environmental stimuli, and expressing these through activating elements that contain lights or consist of colour changing, chromic smart materials. Our project concentrates on exploring how playful, open-ended interactions could benefit specific user-groups, such as those with sensory impairments, autism spectrum disorders and anxiety conditions to support particular therapeutic approaches such as the discreet monitoring of autonomic responses and diversionary therapy.

The prototypes we have developed are made from biodegradable chromic PLA, and incorporate optical fibres as well as sensors that can measure

bodily impulses, such as heart rate and temperature. This makes them both sustainable as well as particularly suited for use in a medical context. To add to this, all non-recyclable components such as thermochromic silicone elements and electronic assemblies, are made fully accessible for easy removal, repair or replacement at the end of their life cycle.

Developing jewellery objects that encourage users to explore them tactilely and playfully by responding to a change in certain stimuli, such as an increasing heart rate, with surprising and enchanting metamorphoses while providing aesthetic intrigue to encourage this interaction, is the main focus of this project.

IBREVE *



© iBreve Ltd



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Founded by two former Google employees iBreve aims to create a world free of stress related diseases.

iBreve's digital health solution empowers self-care by providing its users a better understanding of their bodies' signals and more control over their emotional well-being.

The iBreve wearable analyses breathing patterns in real-time. Our machine learning algorithm correlates breathing patterns, activity & stress level and can trigger a subtle vibration directly on the device or send a notification to the phone. The iBreve coaching app then guides through personalized breathing and relaxation exercises based on clinically proven methods.

iBreve focuses initially on women's health & well-being and designed a discreet wearable which can easily be attached to any bra. When fully developed iBreve's unique technology is able to help patients with burnout, anxiety and chronic respiratory diseases.

iBreve won several innovation challenges, received funding for its dedication to sustainability and got featured in large newspapers around the world.

* Call 1 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

ID LABS



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The Eye, The First Fashion Wearable Camera

The Eye is a unique device designed with the combination between fashion design and the latest state of the art of artificial intelligence technology. The new stylish camera connects wirelessly to your smart phones and supports different applications. These apps has a variety of uses from helping people with vision and memory problems to identify faces and objects around, to giving a new experience of capturing exciting moments in life by taking photos and videos. The Eye is designed and developed by ID Labs and it will be available soon for pre-ordering.

KOBAKANT *



Photo by Aimee Shirley of Freunde von Freunden www.fvonf.com

KOBA KANT

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The development of new technologies is monopolized by commercial enterprise, insuring we all have access to the same solutions. As consumers we only need to choose which one is "right for us". To challenge this reality, KOBAKANT is running a year long experiment, KOBA: an e-textile tailor shop. Only accepting bespoke commissions for individuals, we challenge our customers to think creatively about what they want.

Knowing what we want is a complicated question. Breaking outside the established applications of new technology is hard. Living in consumer societies, it can be hard for us to see just how removed we have all become from the decision and production process behind the objects we own.

*** Call 1** These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

By running a tailor shop and interacting with potential customers, we want to re-establish a relationship between the owner and the technology produced. The garments we make are tailored to fit you and function based on your instructions. You can observe the process of production through our windows. Our process documented online where it is preserved for future repairs and alterations.

KOBA is a place where personalized technology is possible, a platform for the discussion, experimentation and storytelling of alternative realities.

MEDITATION LAB *



© Danielle Roberts - Awareness Lab



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Meditation Lab Experimenter Kit consists of a suit and software. With the kit you can do your own meditation experiments. You can discover how to positively influence your meditation by changing your environment.

The meditation suit Silence Suit houses 11 sensors which combined measure 18 parameters about your body and the environment. The suit has a wireless connection with the software belonging to it: the Dataserver. It logs, displays and analyses the data. The server is connected to a smart light unit which can change colour during the meditation session. Before and after every session you fill in a questionnaire. A learning algorithm will predict from your answers which type of light is most suitable for you.

*** Call 1** These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

MI.MU *



© MI.MU / Adrian Lausch

MI.MU

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MI.MU exists to place human expression at the heart of music technology.

MI.MU is a team of specialist musicians, artists, scientists and technologists developing cutting-edge wearable technology for the performance and composition of music. The team have developed the MI.MU Gloves - a wireless, wearable, gestural musical instrument and controller.

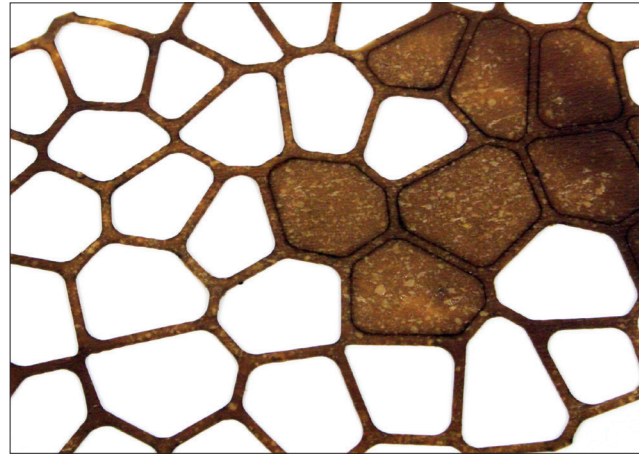
Led by Grammy award-winning musician Imogen Heap, MI.MU have captured worldwide attention by showing that there is a better way to make music than with sliders and buttons – through the complex movement of the human body.

*** Call 1** These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

The MI.MU Gloves are a fusion of textiles and electronic sensors. Combined with dedicated gesture detection and mapping software, they offer a new and flexible approach to the control of music and visuals through intuitive human movement.

MI.MU Gloves are now used by a community of musicians worldwide, ranging from pop star Ariana Grande, to film composers, to physical theatre practitioners.

MOGU *



Leather processed sample cells © Mogu

mogu

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MOGU Leather looks at a future where animals are not killed for human materials' desires. It is to be looked at as an alternative to traditional animal leather, grown by fungi; a new natural material with comparable experiential/tactile qualities to the ones of animal leather, though highly different.

As opposed to traditional animal leather, MOGU Leather can be grown in rather short timeframes, with a limited amount of resources and its production process is not wasteful, hence promising to bring about a great material revolution, leading towards the establishment of a more ethically and environmentally responsible fashion industry, not only in regard to finished products but particularly affecting all steps of the production process and manufacturing.

* Call 2 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

MYCOTEX NEFFA



© Aniela Hoitink | NEFFA

MycoTEX
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There are 7 billion people on this planet that all need to be clothed. Many of us enjoy fashion and trends, but the clothes that we get rid of are a big problem. For MycoTEX we went to the root of the problem.

MycoTEX creates sustainable fabric from mycelium, the roots of mushrooms. With our BB-modelling process we create garments of this new textile that perfectly fit your body without the need to cut and sew! And by implementing electronic components we will be able to develop biodegradable FashionTech.

Our shorter supply chain eliminates the need for chemicals and pesticides. We reduce water usage by 99.5% and local production is reducing transport. We only grow what we need and have no textile waste during the production phase. And AFTER wearing, you can simply bury your garment in the ground and it will naturally decompose.

POPLAR SHOE



© PoplarShoe / M.Erkam Narinç

2018
POPLARSHOE
SMART SHOE MADE OF BIO-WASTE
MATERIAL

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A smart shoe made of bio-waste material integrates you and nature into a unique activity.

Poplar /'pɒp.lər/ fibre is a natural material, which is obtained from populus genus trees. During the middle of May, poplar fibres, which are creamy-white, lustrous and lightweight fall from trees and cover ground just like snow. Poplar fibres offer very unique properties but currently they do not have any usage area in industry due to their length. Each year tons of poplar fibres are just wasted but here our team proposes, to use these fibres to make flexible pressure sensors to be used in a fashionable smart shoe. Concept of PoplarShoe is based on core values of Sustainability, Innovation and Technology. How about giving ear to the peaceful call of nature? Put on your PoplarShoe and feel the breeze. Bring daily improvement to

your well-being. PoplarShoe reforms footwear for a daily use, and combines many disciplines. Unique features of Poplar fibres, nanotechnology, design, art, and electronics all are harmonized in integrity to offer you best. PoplarShoe will offer you to interact with walking, running, jogging like no other way and the PoplarShoe app is your guidance all along the way.

QUIETUDE *



© Quietude Core Team



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Quietude (www.quietude.it) is a collection of interactive jewels that enhance the experience of sound of deaf women. They detect sounds and translate them into vibrations, light and shape changes. The jewellery collection is completed by an app for smartphone allowing personalisation of both input and output, and the construction of a personal library of sounds that can be monitored for, and replayed on demand through the jewels. The project has been developed in co-design sessions with deaf women to enable the development of accessories that respond to the emergent discoveries and desires. Quietude has been designed and developed by a team composed by Santa Chiara Lab- University of Siena (coordinator), Glitch Factory and T4All. Siena Art Institute and University of Southern Denmark collaborated as service providers.

facebook.com/scfablab.unisienna
(Santa Chiara Fab Lab – University of Siena)

facebook.com/glitchfactorysrl
(Glitch Factory)

facebook.com/T4AllSrl
(T4All)

* Call 1 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

RIDEQ *



© RideQ team

RideQ has developed an innovative system of wearables that assist the horseback rider in developing their “vertical seat” (body position in the saddle for non riders). By receiving feedback on specific points when you fall outside your own preferred framework, you intuitively correct your position while riding. Because you do not have to interpret the instructions, you can keep your focus on the task at hand, controlling the horse.

* Call 1 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

RideQ

The first available product controls the heads position since one of the most common problem for riders are that they look down on their hands or the horse, instead of keeping the head upright, looking ahead. The heads position will affect the balance of the whole body and by correcting it, the rider will be in better balance, have clearer communication with the horse and lessen the risk of strain injuries on both.

It is accompanied by an app where you personalize your settings depending on preference and experience as a rider. The whole range between novice and expert can use the product due to this feature.

This system could also be used for other purposes like sports, rehabilitation or ergonomic working positioning.

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SARA + SARAH *

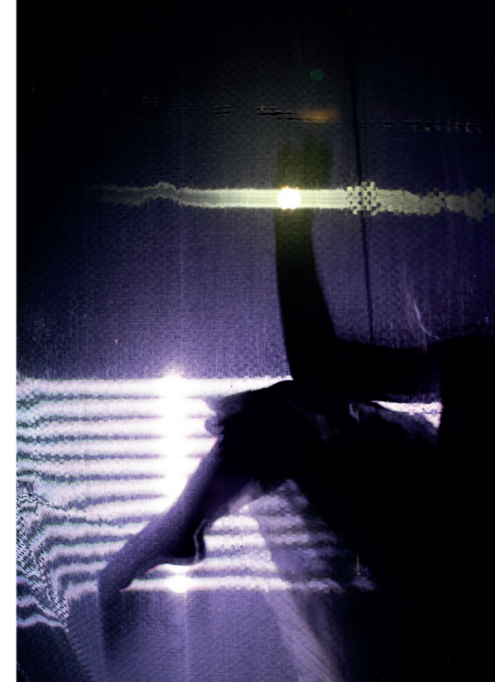


Photo: Margot Watson

LIT – Light Emitting Lace for Performance.

Our vision has been to explore the inherent, programmable potential of newly developed light-emitting lace and to creatively exploit light within and on cloth within a performance environment. The key aims have been to explore the programmable potential of the cloth for sustainability. Our team could see a critical need and opportunity to use the programmable



potential of the light emitting fabric to cut down on the need for large, heavy set designs, the printing of fabrics which cannot necessarily be re-used.

We needed to go back to the loom, back to the materials, back to electronic and lighting technology and develop options for a more flexible and creative design system, and to build infrastructure for our collaborators and potential stakeholders to explore the potential that large scale responsive cloth has to create new display, projection, and visual effects for backdrops, set designs and immersive experiences.

Sara Robertson and Sarah Taylor
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SENSEWEAR *



Photo credit: Alessandro Froio

Sensewear is an inclusive collection of smart garments inspired by therapies applied to Sensory Processing Disorders within the autistic spectrum. Anxiety, stress, panic attack are most typical autism's symptoms but more and more people suffers them, therefore the collection is not addressed only to people with disabilities but it is aiming at enhancing everyone busy urban life. The collection initially included biteable necklace, an aromatic scarf, an inflatable jacket, a stretchable scarf and a musical poncho. Sensewear won several international competitions and founds received through the European Commission gave chance to develop a new series of functioning prototypes: a smart t-shirt that collect vital data and send signals to an application that can activate other garments of the collection, an inflatable jumper delivering Deep Pressure therapy to the wearer and a stress

* Call 1 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

SENSEWEAR

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release tactile charm that monitor wearer use and facilitate communication between therapist and patient. The new prototypes are being tested in a dedicated facility to create solid scientific bases to the next development of sensewear that will see the elaboration of an algorithm that will understand stress level from life signals.

SHELTERSUIT



© Reuters Press Agency

The Sheltersuit foundation is a non-profit organization, that started in 2014. It produces water-and windproof jackets with detachable sleeping bags, specifically for homeless people. The suits are produced in a workshop in the Netherlands, by Syrian and Eritrean refugees.

Highly skilled craftsmen that find a new purpose in working on the Sheltersuits. The foundation uses excess materials, pre-consumer, to make its protective suits.

The idea behind the Sheltersuit is to keep people warm, in order to protect them from life-endangering situations caused by extreme cold and rain. Security of the body is a next step in the desire to protect people. Imagine that temperatures are dropping to a level that a state



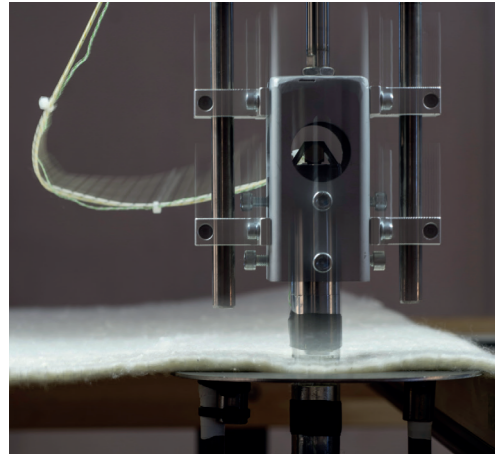
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of hypothermia is reached. First stage hypothermia allows the user to react and call for help. Now picture you were that person, and you needed to make that call. At the highest emergency level, the battery of your phone is dead. The aim of the project will be to develop a novel Urban Safety Kit, focusing on preventing hypothermia and on connectivity, to be integrated into a modular system that will be implemented in Sheltersuits. Together with professionals from University of Twente and Saxion University of Applied Sciences, an Urban Safety Kit will be developed that will extend the functionality of the Sheltersuit.

SMART FASHION PRODUCTION



© Smart Fashion Production

A digital, local, made-to-measure garment manufacturing technology.

Smart textiles have developed over the last couple of years. But the manufacturing into garments is still done in an old fashioned way, mainly based on sewing techniques. It is done at the other side of the globe. With ethical and environmental concerns. We don't understand how we can we can call 'smart fashion' 'smart', if the production isn't.

In this project we further develop our 'smart fashion production' concept together with a new design language. Smart textiles will play an important role because they operate at the cutting edge of the market. Our approach will enable to produce these smart textiles digitally into made-to-measure smart fashion.

SMART FASHION PRODUCTION

We identified three major 'design variables' that will help bringing the technology from a 'proof of concept' into a 'system prototype demonstration': Within **1) manufacturing technique** we are going to extend the micromoulding machine thus it can automatically join separate pattern parts to digitally create smart garments. **2) Material research** will be done to collect and construct new fabrics that are sustainable, fashionable and suitable for our process. This includes e-textiles. Consumer desire depends on how it looks. Our technology and material, requires a totally new **3) design language** and pattern handling. We will design cutting edge couture to stimulate market-pull.

Consumers will appreciate fashion that is made locally, more sustainable and under ethical conditions. In the future, garments will be tailor-made, more comfortable and valuable, while the digital manufacturing approach will make it economically feasible to produce local for a competitive price.

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SOLEMAKER *



© Solemaker Erwin Hoogerwoord

Solemaker BV is a project that enables designers to create Ultra-Personalized, digitally manufactured shoes. Users are able to come to our website, www.solemaker.io, where they generate a shoe to their own shape and pressure profile. While SoleMaker BV was based on our previous research, Wear Sustain allowed us to bring new designers into the Solemaker platform, test our 3D printed shoes to ensure their lifetime of wearability, and develop an effective business plan. Moreover, we developed a new algorithmic back-end that has more capability, is more reliable and leverages breaking edge web technologies to make a great user experience.



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STEALTHY



Photo: Peta Bush

Vitamin D deficiency is a global silent epidemic, the associated health problems include osteoporosis, depression, child birth defects, cancer and multiple sclerosis.

Una by Stealthy is the first modular UV sensor enabled jewellery collection designed to tackle Vitamin D deficiency in women. "Una" is the first collection developed under the Stealthy brand, and is designed with inclusivity, modularity and sustainability in mind – the stealthy woman can wear Una in a bracelet, necklace or modestly as a hijab pin! Our goal is to unite women in the quest for better health and well-being. The "Una" coupled with the Stealthy Woman lifestyle app is designed to raise awareness of Vitamin D deficiency and

facilitate healthy conscious behaviours by encouraging women to go outdoors in optimal sun conditions and ingest Vitamin D from natural sunlight.

Stealthy is the brainchild of Nadiya Siddique – In 2015, Nadiya lost her academic scholarship and place to study a Masters in Fashion having sustained two broken ankles during a hiking accident later discovering she was critically Vitamin D deficient. In 2017, Stealthy was born after months of research and Nadiya's passion to create an innovative product to bring Vitamin D deficiency awareness to women globally.

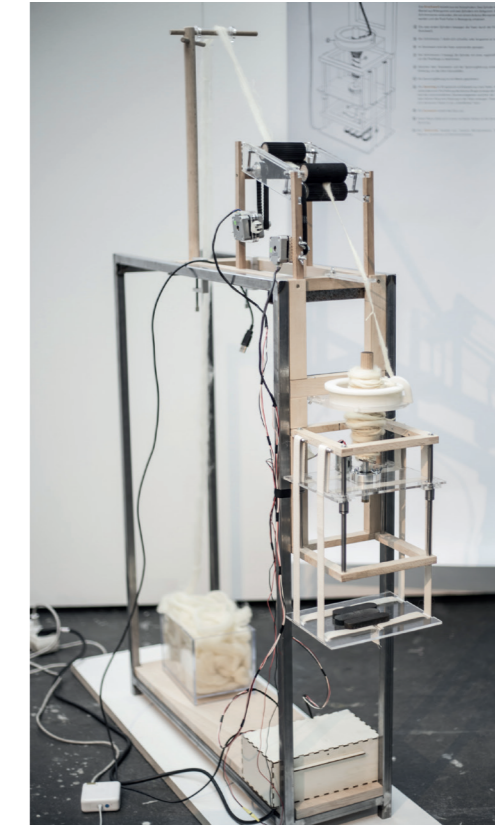


UNA
BY STEALTHY

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STUDIO HILO *



© Sara Diaz Rodriguez

H I L O

The HILO machine is a compact spinning machine which can be installed in any textile workshop. It allows professionals and enthusiasts alike personalized, local and on-demand yarn production.

The HILO machine is controlled by the user-friendly HILO software. It allows users to translate digital patterns (such as an image) into different yarn properties which results in customized yarn with unique tactile and aesthetic qualities.

The Studio HILO project extends beyond the machine and software and aims towards building an active community of users. By making the blueprints and source-code freely available online, we invite users and maker to build their own HILO machine, code with us and share their experiences, improvements or customizations with the HILO community.

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* Call 1 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

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TEXTILE REFLEXES *



Photo credit: Hellen van Rees

Textile Reflexes is a project where shape changing sustainable textiles are developed to give feedback to users and applied in coaching situations. The first working prototype of this project is a posture correction coach. The vest can be worn over regular garments and it measures when the user has an incorrect posture. It then pulls the flexible panel of squares at the back to subtly remind the user to sit back upright.

Textile Reflexes is a multidisciplinary collaboration between the following team members:

Hellen van Rees – Textile & fashion designer
 Angelika Mader – Creative technologist University of Twente
 Geke Ludden – Interaction designer University of Twente

Hellen van Rees,
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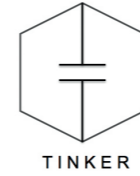
TINKER DESIGN



Photo: Thushara Sabreen

Tinker Design uses technology to delight, empower and enrich our everyday wellness.

Athena is a smart interactive massage shoe for a customised massage on your feet on the move. The shoe embodies the resurgence of artisan craft with a fusion of technology. Entwining the past with the present is a concept explored where an “invisible heritage” of intangible tradition skills is not behind us (recognised by UNESCO as in need of protection) but entwined with contemporaneity.



Tinker adapts the combination of design, technology and sensory touch conveying experiences beneficial for health, elates comfort and stimulates emotion. Athena a new form of shoe therapy for feeling good, an experience designed to appeal to the human senses.

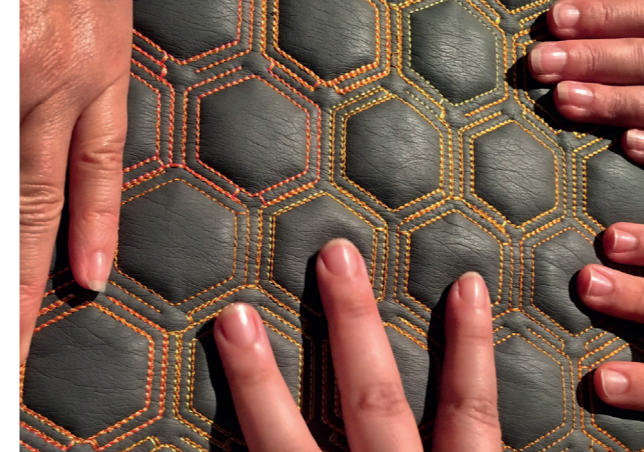
The project evolved from collaboration with University College London (UCL) and London College of Fashion, MA Fashion Entrepreneurship & Innovation. Tinker Design was supported by the Centre for Fashion Enterprise (CFE), London College of Fashion and Cambridge University - Judge Business School.

The project developed with WEAR Sustain adapts principles of a circular design methodology with a modular design approach in consideration of e-waste attempting to address sustainable and ethical issues faced today.

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TOUCH CRAFT *



© Rachael Allain

Touch Craft is a not-for-profit organisation that explores methods of embedding stories into textiles as a way to engage different audiences and contribute towards social cohesion and well-being.

Using electronic textiles techniques or e-textiles, gives us the ability to embed electronics and digital capability as component parts of soft, familiar surfaces. We have designed and developed a range of sensory, responsive objects from rugs, blankets and pillows that have been embroidered and enhanced with electronics and sensor technology. The objects are able to produce sound, light or vibro-tactile effects as a response to touch.



Lucie Hernandez,
 Electronic Textile Designer
 and Project Coordinator

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Touch Craft have experience in facilitating creative workshops to explore methods of combining textiles and technology. We work with local groups, engaging participants in creative making activities to provide a sense of purpose and motivation. Direct involvement in creative activities gives people a platform to tailor and personalise the objects they develop, building in their voice and stories. We work with participants to implement soft circuits and electronic components to bring the objects to life, making them responsive and personally meaningful.

WEARABLE ENERGY – TEXTILE BATTERIES



© Diffus Design

The goal of this project is to develop a new way of battery integration into wearable smart textiles. The idea is to create visually appealing battery patterns right onto fabrics where everyone can see them. Designing the battery patterns in an aesthetical way creates completely new possibilities for smart wearable applications. The idea of this project is to take advantage of the development within printed batteries on foil and transfer the technique to textile. One advantage of this approach is that fabrics provide a huge surface which can be used for functionalisation. This means that a relatively big amount of energy can be stored in printed batteries. By aiming at decoration and wearability we do not need to think about the problems that might occur when minimizing the battery area. By looking at the



battery as an asset rather than a necessary evil we can make batteries beautiful and wearable.

This approach will function as an enabler technology for the next generation of Smart Textiles, so that the existing product prototypes e.g. for assisted living can finally enter the market to enhance everyone's life.

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* Call 2 These highlighted teams scored highest against our monitoring criteria successfully throughout the duration of their project.

WISP



WISP

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© Wisp

Shifting societal views of pleasure, WISP creates connections and opens minds to sensual intimacy. We feel a glass wall needs to be shattered, the one separating women from men when it comes to what's 'acceptable' for expressing and enjoying sexuality and physical pleasure. WISP not only starts the conversation, we follow it up with innovation and design. Alongside the sex-tech industry, we create the SENS-tech (Sensual Tech) industry to encourage the exploration, experimentation and expression with a renewed sexual sensibility.

Designed in London, WISP's first collection: the SENS sensory jewellery line brings high-fashion and technology together again to stimulate your senses through interchangeable sensory inserts featuring delicate scents, textures and movement.

ZISHI, SMART GARMENT FOR REHABILITATION



zishi

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Designer

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Zishi is a garment designed to support posture monitoring for the purposes of rehabilitation training. It has been designed with attention to presenting accurate and informative feedback to patients regarding their thoracic and shoulder posture as well as comfort, ease of use, wearability and aesthetics. Zishi can be useful during rehabilitation training for a variety of patient groups. So far, we have been concerned with two broad training scenarios a) for arm-hand (neurological) rehabilitation training after stroke or for MS and spinal cord injury patients. B) for shoulder patients. Zishi consists of a garment integrated with smart textiles and wearable electronics. It presents real-time feedback as a vibration delivered through the garment, visual and audio instructions through android-hand held device (smartphone or tablet).

SUPPORTING ORGANISATIONS

The following organisations have provided WEAR Sustain with invaluable support during the last two years. We would like to thank everyone here very much for your support and we look forward to continuing to work with you beyond the end of the project.

Aarhus University

Ars Electronica

B&M Theocharakis Foundation
for the Fine Arts and Music

Baltan Laboratories

Barcelona FabLab

BASE Milano

Creative Ring

Design Lab Twente

Digital Catapult

ENSAD Lab

e-stitches

FABelgrade

Fab Lab Zagreb

H&M Heritage and Museums

Hellenic Clothing Industry Association -
Textiles and Clothing Design Lab

HELGRAMED - Hellenic Union of Graphic
Arts and Media Technology Engineers

IDEGUI - Instituto de Design de Guimarães

INOVA+

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MAD Brussels

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Makers of Barcelona

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