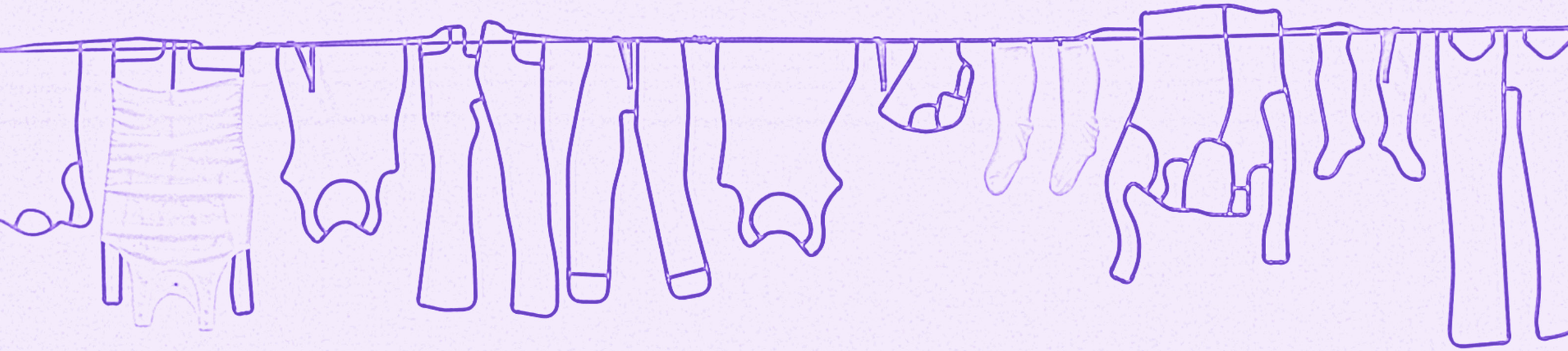
SMART TEXTILES SALON
Vol. 3

Prototypes on Stage, 06 June 2013
Ghent University, Ghent (BE)



PROCEEDINGS

WELCOME !

Lieva

Carla

Lina

Foreword

The concept of smart textiles has evolved from a multidisciplinary research field into a new generation of advanced textile products for a wide range of applications. New businesses have been established and existing companies have taken up smart textiles in their product range.

SYSTEX the European coordination action on smart textile systems, has launched a set of activities that have contributed to this success. One of these activities is the Smart Textile Salon (STS). The STS aims at demonstrating the potential of smart textiles by showing working prototypes to industry, developers and researchers. The SYSTEX student award wants to encourage students to make their thesis in the area of smart textiles. As in the previous editions, this year's STS combines the salon with a course on smart textiles in cooperation with the Ghent University Institute for Lifelong Learning. The course consists of a theoretical and a practical training and a guest lecture on end of life of smart textile products.

In your hand you're holding the proceedings of STS2013 full with information about the prototypes shown at our interactive exhibition. This demonstrates smart textiles is no longer limited to simple health monitoring products. Today it covers the full functionality range: sensors, actuators, data processing, energy and communication. Smart textiles has reached its point of commercial breakthrough.

We are proud that the SYSTEX project has contributed to this evolution.

Enjoy the workshop!

Lieva

Lieva.VanLangenhove@UGent.be

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Why Textiles? – Benefits of Textiles

We are often asked about the reason for integrating electronics into textiles, the so-called e-textiles. Here, we would like to explain the benefits of textiles could offer when thinking about the integration of electronics.

Textiles show a variety of advantages when compared to other kinds of material. Of course, you can find textiles in apparel and interior but also as functional surfaces in other application fields. New fields, also in research, are geo-textiles, building and construction or automotive. In all those application fields, textiles offer unique properties.

Material

The basic materials for textiles are extremely versatile, in products as well as in manufacturing processes. The building blocks of the textile material are fibres or filaments. Fibres and filaments can be made of a broad range of materials: natural or synthetic polymers, ceramic or metallic materials. They are made of one single material or can be made of a material combination in different ways, like

Concentric sheath/core | excentric sheath/core | side-by-side | pie wedge | islands in the sea

Textiles can be equipped with several functions, from chemical to mechanical finishings everything is possible and most often applied in routine business. From anti-pilling to anti-staining, from plasma treatment to simple coatings, you can give your textile material the properties you like. So besides the intrinsic properties of fibres additional treatments can be applied to change or give extraordinary properties to your material. The traditional textile properties can upgrade so that the textiles become multi-functional when advanced with eg. a hydrophilic/hydrophobic, antimicrobial, selective permeability.

Shapes and Dimensions

Textiles are available in many dimensions: with varying lengths (mm up to m), fineness (nanometer up to mm), cross-sectional shape (round, triangular, multilobal, …), surface roughness, etc.

hollow trilobal ribbon special shapes

This result in a very broad range of properties: from very strong to very elastic, hygroscopic or hydrophobic, biocompatible, biodegradable, solid or porous, optical or electro-conductive, and many more.

Combinations

Consequently, innumerable combinations of the mentioned source materials result into a whole range of textile materials. Fibres of one or various types can be arranged at random or in a strictly organized way in one- or two-dimensional structures (yarns or fabrics). Nowadays, even three-dimensional (3D) structures can be constructed. A high level of order or a very random arrangement in non-wovens can be achieved.

When thinking of textiles, people tend to have something fabric-like in mind, nobody would think of artificial turf or sensors in construction. Especially, when it comes to composites, meaning fibrous structures embedded in a matrix, people are not aware that they belongs to the world of textiles - not flexible but plastic-like.

During manufacturing, all kinds of special designs can be made and pockets or accessories such as buttons, ribbons etc. can be inserted or added. This provides many possibilities to embed non-textile components in an invisible way if needed. It also demonstrates that nearly every effect can be achieved when the right materials are combined in the right way.

Body Contact

Textiles in form of clothing are our second skin. They can be made to measure, with a perfect fit and high level of comfort. Today, it is possible to use a (body) scanner for manufacturing a perfect fit piece of textile on industrial machinery.

Apparel makes contact with a considerable part of the body without causing discomfort. This means that textiles offer a good solution when long term body contact on several places or in large areas is required, e.g. for sensing and actuation. Here the amount of cables, connectors, batteries, etc. can be reduced to a minimum.

Social Context

Textiles have multiple connotations in our social/societal contexts. They are emotion driven and have a strong aesthetic appeal, offer the opportunity to position yourself in different environments. Without clothing, human beings would not be viable. They need the textile surface to protect, decorate, acknowledge the societal status - this aspect was altered in recent times. Textiles offer a tremendous opportunity of interconnected design thinking and approaches. Different approaches may be envisaged, the appropriateness of materials, production processes, the role of craft, handmade and the ethically produced, recycling, up-cycling, multifunctional design, bio-mimicry – nature as design inspiration and maker. Textiles offer the opportunity of cross-cultural and cross-sector co-operations.

User-friendliness

Clothes are a common material to all of us, in nearly all of our activities. They can look nice and attractive, the design and look being adapted to the actual consumer group. We all know how to use them and nobody is reluctant to wear clothes. If you integrate special aid, nobody would be able to guess that it could be embedded in a textile, which is an important psychological advantage.

Maintaining textiles is a daily practice: house as well as industrial laundry are well developed. The user on the one hand knows how to handle cleaning, the developer on the other hand has precise guidelines and targets for wear conditions.

Manufacturing

The textile industry is well developed and has vast channels of distribution and sales in shops all over the world. Production techniques are applied thousands of years already, progressing continuously. Also testing methods are established. Furthermore, textiles and clothes can be produced on fast and productive machinery at reasonable cost.

Integration of Electronics into Textiles

Full success, however, will only be achieved when integration of electronics, like sensors and all related components, into textiles is completed and they are entirely converted into 100% textile materials. This is a big challenge because, apart from technical considerations, concepts, materials, structures and treatments must be focusing on the appropriateness for use in or as a textile material. This includes criteria like flexibility, water (laundry) resistance, durability against deformation, radiation etc.

The above-mentioned textile characteristics open up a number of applications that were not possible before, especially in the area of monitoring and treatment, such as:

– long term or permanent contact without skin irritation,
– home applications,
– applications for children: in a discrete and careless way,
– applications for the elderly: discretion, comfort and aesthetics are important

Initially, apparel or textiles offer a new platform for the integration of electronics. This soon will change into a true e-textile approach with all kinds of electronics functions invisibly integrated into the textiles. The concept guarantees products of light weight, higher comfort during use and thousands of opportunities. This "All-in-one" strategy will change our way of life and make a difference in the way people live and interact with each other, since textiles are everywhere.

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PROTOTYPES ON STAGE

TIO3 – Basic Components for E-Textiles

TIO3 (Textile Open Innovation Centre)

info@tio3.be

TIO3
Textiles Open Innovation Centre

TIO3, the Textile Open Innovation Centre in Ronse, is a place where everybody who works with textiles is welcome: students, engineers, designers, artists, … TIO3 created a platform where various challenges can be examined and dealt with in creative manners. The guiding principles are inspiration and experiment On the one hand it offers you the possibility to retreat in our Materio Textile Database and professional library to be inspired by textiles in all its aspects. But you can also set to work in our FAB(RIC) LAB. In the Fab(ric) Lab, we offer various techniques that you can experiment and shape the future of textiles with.

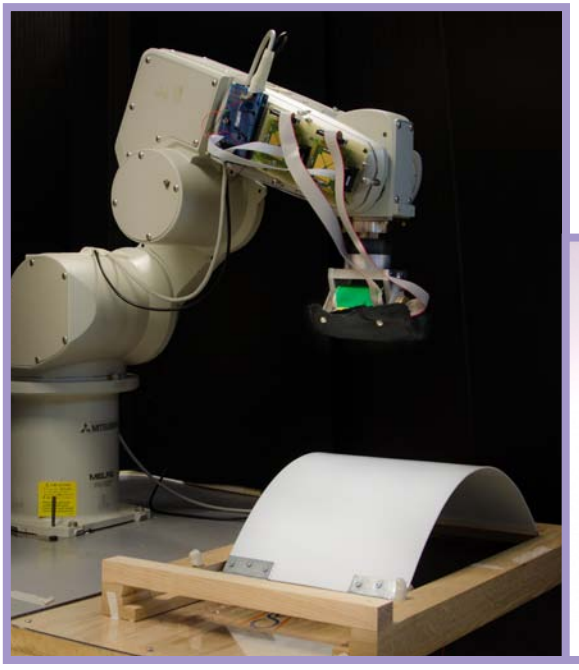
Currently, the Fab(ric) Lab offers a laser cutter, an embroidery machine (10 heads), a loom (4 shafts), an Electronic Lab (where you can work with intelligent textiles, LEDS, Arduinos and conductive yarn), sewing machines and an overlock. For the Smart Textile Salon TIO3 gives you a view on the basic components for every form of E-Textiles: fabrics, electronics, soft conductive materials. Combine these materials with creativity and the solutions are endless. TIO3 will also showcase some of the prototypes developed at this Fab(ric) Lab.

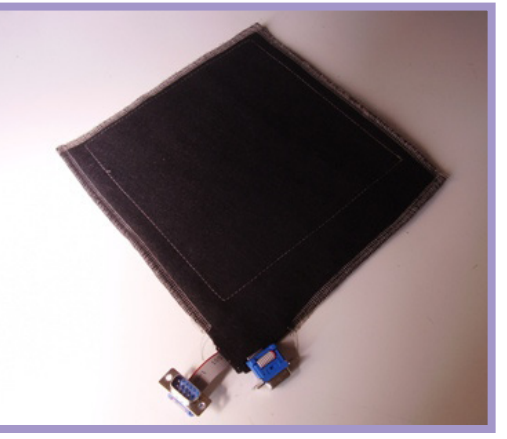
TIO3, the Textile Open Innovation Centre in Ronse, has set itself a challenging mission. A mission in which creativity, research, science and industry are brought together to stimulate and accelerate cross-pollination between people. It is that cross-pollination which could lead to new economic impact and that is the ultimate objective of TIO3.

Textile Matrix Sensor

Riccardo Marchesi

rmarchesi@inntex.com





Matrix sensors are pressure sensors able to detect the x and y coordinates of the point where pressure is applied through two arrays of conductive striped layers placed at 90°. These sensors are also able to measure the applied pressure with precision, low hysteresis and good linearity. Sensors are made using 5 layers of fabric, two of which are formed by alternate conductive and non conductive stripes. A piezoresistive fabric is placed between the two conductive striped layers, and an interface cable is connected to the conductive stripes of the striped fabrics. A sensor connected to a simple microcontroller can map and visualize on a screen pressure applied on the sensor. Maximum resolution: 5 mm, Maximum sensor size: 1000 mm x 2000 mm Applications are: pressure detection systems for therapy and rehabilitation, robotics. These technology is particularly interesting because the cost of the raw materials is low, the quality of the readings is accurate, it is possible to produce shaped sensors, sensors can be placed on a three-dimensional surface.

Riccardo Marchesi was born in Florence, Italy, in 1962. He graduated in electronic engineering at the University of Florence in 1987. In 1987 joined SCOMAR srl, soon becoming Export Sales Manager for flat knitting machines. Starting from 1992 he was also involved in the development of new machines. He is the inventor of two International Patents. In the year 2000 the company started changing its production lines, and Riccardo Marchesi started studying knitted and laminated technical textiles for electromagnetic shielding. Since 2008 he develops interactive textiles. He is the founder of plugandwear.com.

RUAH

Guilia Tomasello

tomasello.gi@gmail.com

Body as an object and dress as a second skin, RUAH is an interactive corset controlled by Arduino. This geometric corset helps people to learn the importance and the benefits of a deep diaphragmatic breath. The circuit is composed by a sensor sewn on an elastic belt and an actuator placed inside the corset. The stretch sensor catches the move of diaphragmatic breath and sends a feedback from lilypad to muscle wire, a flexinol spring, inflating and deforming the centre of the structure.Through this interaction between user and bustier, the user becomes conscious about his body and his breath, increasing his sensory abilities and his physical endurance.The slow controlled breath, which balances body and mind, is acquired only after a long workout. As the wearer feels it like a real second skin, RUAH transmits and receives emotional feedback, contrasting a continuous sense of stillness and movement, opposite feelings that surround us and join up to ecstasy.

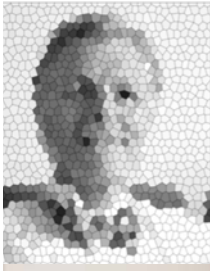
Giulia Tomasello has just graduated in Product design at NABA, Nuova Accademia di Belle Arti in Milan, where she learnt the importance to be able free, creative and ready in front of Good Ideas. The prototype is her final BA thesis project: a continue research of smart textile materials through an open source philosophy.

Drapely-O-Lightment: An Interactive OLED Skirt

Loe Feijs, Marina Toeters

L.M.G.Feijs@tue.nl; marina@by-wire.net

Since the integration of electronics into clothing is gradually becoming more common, we face discrete components in limited numbers locally embedded. 'Techno-squares' like OLED, solar cells, QR-codes, PCBs and magnets need to fuse with more or less traditional fabrics. Drapely-o-lightment is a skirt created as an exploration into the integration of electronics and garment. Drapability and light are the two design themes of this skirt. The light sources used are OLEDS (Organic light-emitting diodes), which is why the skirt is named Drapely-o-lightment. Philips Research asked to explore the OLED-possibilities: the latest development in light technology. The challenges of embedding techno-squares are twofold. The first challenge is to visually integrate the techno-square in the fabric such that it appears to belong (rather than being an island or alien body). The second challenge is the drapability of the fabric-patches combination. The skirt has an outer layer of about 2500 triangular patches which locally are replaced by squares. The triangles provide for interesting draping whereas the squares allow embedding of the OLEDs. The shape design of the patches is done with a new algorithm using Voronoi diagrams. We could benefit from open-source developments such as Processing and Arduino. We are happy to make our Arduino program available for free usage and modification as "supplementary materials" to Smart Textile Salon.



Loe Feijs (1954) has an MSc in electrical engineering and a PhD in computer science. He worked on video compression, formal methods and industrial design. He is professor for the chair Industrial Design of Embedded Systems at TU/e.

Marina Toeters (1982) is educated as graphic and fashion designer and finished her Master of Art cum laude at MAHKU Utrecht. She initiates and motivates collaboration for fashion innovation and is initiator of by-wire.net, working amongst others for Philips Research, Philips Design, Kwintet workwear and European Space Agency (ESA). Toeters is member of the research group Smart Functional Materials at Saxion. She teaches at Saxion, at TU/e and at the University for Art and Design Utrecht. More info: www.by-wire.net

Solar Fiber: Proof of Concept

Aniela Hoitink, Meg Grant, Ralf Jacobs, Marina Toetersi

info@solarfiber.nl

Electronic devices are ubiquitous in daily life, but we often feel totally lost when our batteries die. So why isn't there a decent solution for this? Like a wearable solar charger? Solar Fiber is a flexible photovoltaic fiber that converts sunlight energy into electrical energy. We aim to develop this as a yarn that can be worked into all sorts of fabrics, but with the added advantage of being able to produce an electrical current. Developing a photovoltaic fiber is not a completely new idea, nor is it a simple task. We don't want to wait for years to get people excited about this innovation, that's why our development approach is two-fold: 1. First and foremost, we are working on a a photovoltaic fiber with a protective coating that will likely start its life as a 5mm fiber and eventually be extruded to 100µm. 2. Before we get there, we are working on proof of concept prototypes that will help to communicate our idea and show real life applications for the technology. Our current prototypes work via woven glass fibers that guide the light to tiny diodes with PV solar cells. In 5 years we hope to offer the world affordable Solar Fibers in a range of textile products for daily use.

Solar Fiber is a group of four enthusiastic designers who met during a brainstorming session organized by Ideas Waiting to Happen. We are: **Marina Toeters** – textile technologist and designer specializing in producing and developing yarns and fashion technology applications. **Ralf Jacobs** – technologist and systems engineer working in the high-tech industry. **Aniela Hoitink** – concept designer, translate technology into surprising, tangible results in textile. **Meg Grant** – maker and designer of wearable electronics and smart textile devices.

Hell–Well–Being: A Waste Conscious E-Scarf

Beam van Waardenburg, Marina Toeters

contrechoc@googlemail.com; marina@by-wire.net

The aim of our project is to investigate and report the design process of an e-textile in the context of awareness of the environmental problems created by textiles containing electronics. After it's lifecycle the discarded scarf will be a mixture of textile and electronics, which is difficult to recycle, either by the textile recycling or the electronics recycling. Designers should be able to produce a design that takes this pollution into account when e-textiles are mass-produced. The "Hell–Well–Being" e-scarf warns the wearer against pollution. The knitted polyester in Möbius ring-shape scarf contains a MQ-6 gas sensor, a led display, a lipo battery, a chip and a switch. We used the pattern of the LED bar as the base of the design. The pixel font is derived from the bar pattern. The words used are "being" in the middle, and "hell" (indicating a bad situation) and "well" (indicating a healthy environment) at either side. The colors, light sparkling gray and fluorescent pink, are chosen because of their attractive combination and pleasant looks, keeping track of the 'future is happy' predictions.

Beam van Waardenberg. Teacher design and technolgy WdKA Rotterdam. Former autonomous artist. Project the artist as a bureaucrat. Projects in smart textiles. Projects hacking of gadgets. Succesfull Instructable: "Hack that hloy USB cable". Teacher computer science HSLeiden. Projects "Die Liebe" and "Recht haben", Bremen, Germany. Projet Café Mécanique, second Price Webdance competition NPS. Project "La Division Humaine" Dunkerque, France. Stage Design "Voyageur Solitaire" Lille.

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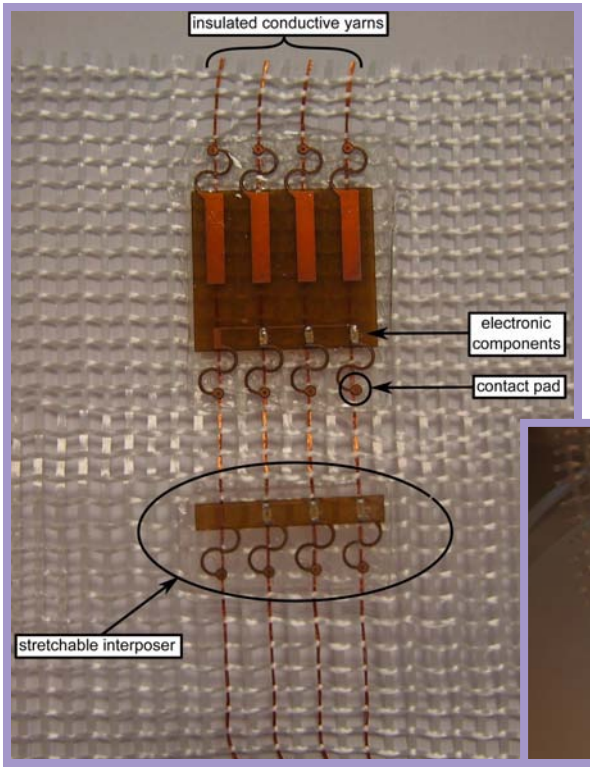
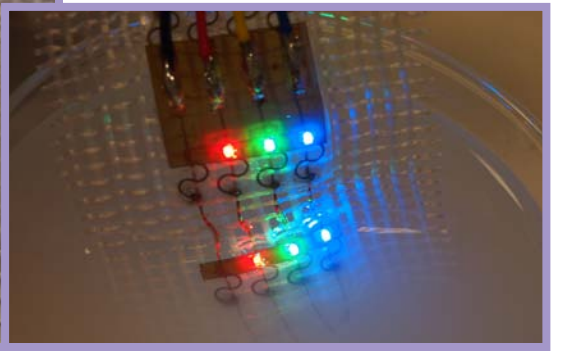
Marina Toeters, educated as fashion designer- finished her Master by exploring the gap between designers and technicians in the world of fashion. She motivates collaboration for fashion innovation and is initiator of by-wire.net, design & research in fashion technology. Working amongst others for Philips Research and European Space Agency. Toeters is member of the research group Smart Functional Materials at Saxion. Coach in Wearable Senses at TU/e and lecturer / Fashion eco- & technology at the School for Art and Design Utrecht. More info: www.by-wire.net

Lighting Applications with Woven Textiles as Substrates

Bjorn Van Keymeulen, Frederick Bossuyt

bjorn.vankeymeulen@ugent.be





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SEVENTH FRAMEWORK PROGRAMME

pasta

Nowadays integrating electronic modules on textiles can be done in different ways. The fact remains that most techniques encounters still a lot of problems, including:

- textile properties of the fabrics are distorted too much, e.g. implementation of rigid modules on textiles
- mechanical reliability, e.g. breakage of flexible connections
- compatibility with textiles, e.g. using solder joints to make contact with conductive thread
- washability

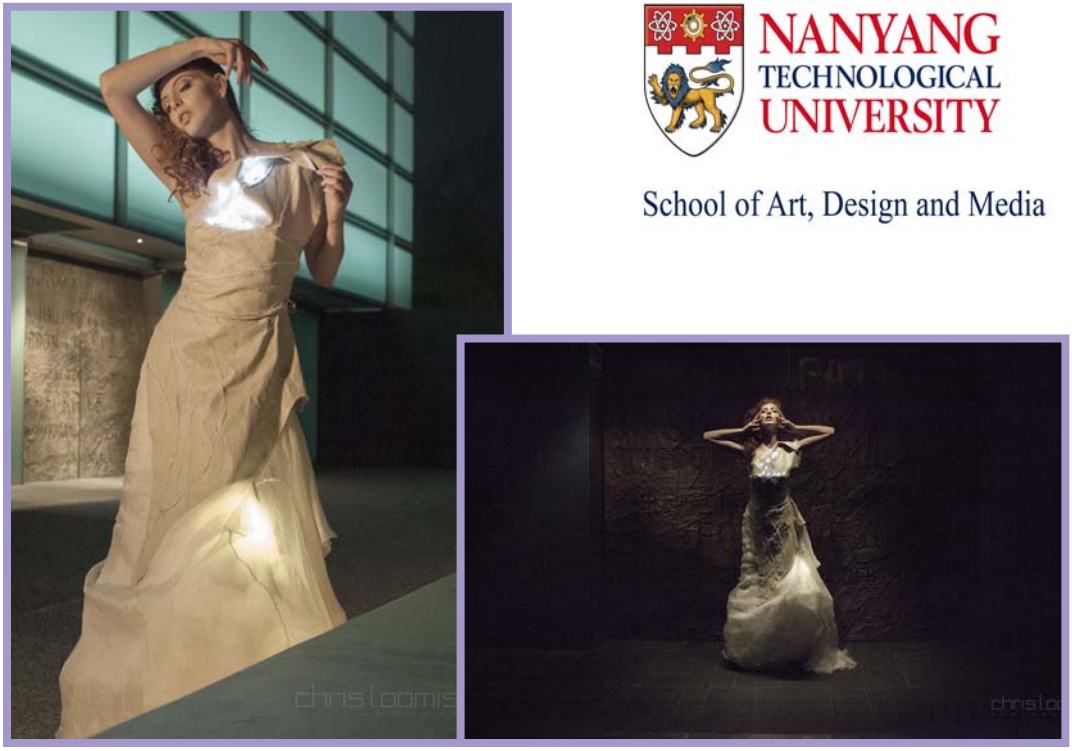
To overcome the above mentioned problems CMST/IMEC proposes a novel approach to integrate electronic and electrical components on a wide variety of textiles. The unique technology combines stretchable electronic circuits with a woven conductive yarn network. The stretchable interposers will serve as intelligent units, while the conductive yarn network acts as a sensor grid, an electric wiring system, etc… By using a unique interconnection process it is able to establish an electrical contact between a wide range of conductive yarn, which can be insulated, and stretchable interposers. The presented demonstrator will show how single LED's and RGB LED's can be integrated in woven textiles without disturbing the typical textile properties of the fabric. The electrical power will be distributed by an insulated conductive yarn system. The combination of an insulated conductive yarn system and a totally insulated interposer concept results in a washable product.

Bjorn Van Keymeulen received M.Sc. degrees in Electronics-ICT from College University Ghent and in Electrical Engineering from University Ghent, in 2010, respectively 2012, Ghent, Belgium. In 2012 he joined research group CMST, University Ghent, as Doctoral Researcher. His current research interests include stretchable electronics and integration of electronics into textiles. **Frederick Bossuyt** was born in Kortrijk, Belgium, on September 15, 1983. He received the degree in electrical engineering and the Ph.D. degree in electrical engineering from Ghent University, Ghent, Belgium, in 2006 and 2011, respectively. Since 2006, he has been with the Center for Microsystems Technology, where he is teamleader for stretchable electronics technologies.

Trasendense

Galina Mihaleva

gmihaleva@ntu.edu.sge



NANYANG TECHNOLOGICAL UNIVERSITY

School of Art, Design and Media

Transcendent is an interactive dress that communicates with its wearer by translating the body's movement into a corresponding light pattern.

To achieve this effect, the seamless top made from molded Sahara white leather and a 100% silk organza skirt are esthetically embedded with functional technology, becoming a dress with its own way of expression. A collar extension on one side of the dress has embedded within it a flex sensor that responds to the body's movement, this is processed by a microcontroller which controls the illumination pattern of the LED array; it is powered by a lithium-polymer battery. The tiny LED lights embedded into the "skin" of the dress fade in and out according to the intensity of movement and have become a decorative language. Light (as in opposition to heavy), works as something that floats in a heavenly manner on the textured, leather surface. The light is metaphor for enlightenment and strives for passion. The dress is the ultimate wedding dress that expresses emotions and communicates on another level where body and mind or body and desire can be in two places at once.

In essence, a saintly aura appears around the wearer as well as that of "new celebrity."

Galina Mihaleva was born and raised in Bulgaria and earned a master's degree in fashion design and textiles from the Academy of Fine Arts in Sofia. In 1992 she came to the United States to study costume design at ASU. Most recently her designs have been featured on live television and in printed publications, which include Phoenix 21 century book, Trends, Java and Desert Living magazine. Her innovative designs and strong silhouettes have walked many a red carpet and have been future in fashion shows like the Scottsdale Fashion Week and the Millionaire's fair. Unbounded by the old rules, Galina now offers her work as a joyful testimony to the power of beauty and expression, and to the transcendent human spirit.

TaSST: Tactile Sleeve for Social Touch

Aduén Darriba Frederiks, Gijs Huisman

a.darriba.frederiks@hva.nl; gijs.huisman@utwente.nl

UNIVERSITY OF TWENTE.

Hogeschool van Amsterdam
Amsterdam University of Applied Sciences

COMMIT/

TaSST
Tactile sleeve
for social touch

In computer-mediated communication (CMC), we mainly rely on our visual and auditory senses e.g. video chat. However, in real-life communication, we use many of our sensory capabilities when we communicate with others. One of our senses that can have profound effects on our affective state, but is underused in mediated social communication, is our sense of touch. We developed the TaSST to allow two people to communicate different types of touch at a distance. The TaSST, worn on the forearm, consists of an input and output layer. The input layer is a conductive wool sensor grid, of which each sensor compartment contains felted pads of conductive wool. By measuring changes in the internal resistance of the wool, the grid controls the intensity of the vibration motors in the output layer of a second TaSST sleeve, worn by another person. By varying the location, duration, and intensity of touches to the input layer, users can communicate different types of touch at a distance. Current developments of the prototype include a redesigned input layer that uses knitted conductive wool pads, which allow for a more accurate capacitive sensing technique, and the use of linear-resonant actuators for more detailed vibrotactile feedback.

Aduén Darriba Frederiks is a researcher and lecturer at the Digital Life center of the Amsterdam University of Applied Sciences. His research focuses on tactile and tangible interaction in healthcare settings, specifically care for elderly people. Besides his research interests, he is active as an artist exploring the combination of technology and fashion. Gijs Huisman is a PhD candidate at the Human Media Interaction group at the University Twente. His research focuses on investigating the effects of mediated social touch (i.e. touch at a distance) on people's emotional state. The TaSST project is supported by the Dutch national program COMMIT/.

Baroesque Barometric Skirt

Rain Ashford

rainycatz@gmail.com

Goldsmiths
UNIVERSITY OF LONDON

The Baroesque Skirt creates a unique visualisation for each place I visit, which changes depending on the environmental conditions of the day and my own physiology. It visualises data from four sensors, three of them are environmental: temperature, pressure and altitude, the forth is a temperature sensor that sits on the inside of the skirt and pulls in my body temperature. I'm interested in how I can display my physical data alongside that of the 'bigger picture' of elements that I am surrounded by. I made a bespoke skirt for this project due to the way I wanted the RGB LED strip to display from inside. The components are sewn into a removable components substrate apron, which goes in the middle of the skirt fabric and lining layer, with a fitted pocket to hold the 12V battery pack. The skirt has hand painted Okami characters, which incorporate weather designs that entwine with the RGB LEDs underneath. I've written the code to drive the components in C, with the inclusion of the Wiring library and the example code library for the BMP085 which does all the complex calculations to convert readings to °C (Celsius), Pa (Pascal) and m (meter) readings.

Rain Ashford is in the 2nd year of her PhD research on the Art and Computational Technology Program in the Department of Computing at Goldsmiths, University of London. Her research practice involves looking at ways of visualising physiological data taken from sensors placed around the body. She's particularly interested in visualising data during social situations using a plethora of sensors such as EEG, GSR, heart rate, temperature, proximity, movement and more. Her projects involve bringing together a convergence of electronics, code in the C programming language and bespoke garments and accessories.

Your Balance

Barbro Scholz

barbro@barbroscholz.de

What could be the role of textile user interfaces in the digital age? YOUR BALANCE is an interactive, textile jewelry with the inspiration taken from insects. It is a critical design project that deals with the control through the 24/7 availability and the expectation of efficient time-use we live with today. It questions our passive acceptance of applications of control in our daily life and asks what we want textile user interfaces to be. The three textile sensors monitor the movements of the employee to a system, watched by the employer to control the employee's life balance. Communication between employer and employee becomes closer, the amount of work and responsibilities can be adjusted according to the data and long-term efficiency is provided. Are we like worker-bees, working efficiently towards the center of the hive?

Barbro Scholz is an artist and textile designer. She has her background in design with a focus on electronic textiles and interaction. Her interest is the impact of designed objects on society, especially textiles as user-interfaces for technical devices or as the device itself. She thinks the change of possibilities in material choices and size for devices raise new questions to designers. She believes that our life and behavior change and that the designer's visionary role becomes even more important as well as the responsibility of designers to ask critical questions.

Strokes&Dots (3S&D) - 2013

Valérie Lamontagne, 3lectromode.com

valerie@3lectromode.com

3S&D is part of a micro-collection inspired by early Modernist representations of speed, graphic design, abstract art and technology as well as the print work of Russian/French textile visionary Sonia Delaunay. Created with rapid protoyping technologies of the 21st century such as digital textile printers, and the integration off-the-shelf technological add-ons, the garments are designed to be DIY-assembled. There are 16 unique designs in total.

Technology: The designs have a series of embroidered LEDs (5-12) and a motion or light sensor, transforming the rhythm and illumination of the LEDs in tandem with the wearer's movements, or by reacting to immediate environmental light fluctuations.

Materials: The garments are made of digitally printed silk textiles, electronic hardware, and hand-embroidered hard & soft circuits. The designs can be bought as DIY kits or as finished garments. The electronics are coin cell battery operated.

Funding: Canada Council for the Arts; Concordia University Part-Time Faculty Association.

Credits: Design: Valérie Lamontagne / Seamstress & Collaboration: Isabelle Campeau /Engineering & Programming: Hesam Khoshneviss / Photography: Julia Marois / Styling: Isabelle Campeau / Hair & Makeup: Marie-Charles Nadeau / Models: Mathilde & Yollie (Dulcedo) / Accessories: Annex Vintage

Valérie Lamontagne is a PhD scholar researching "Performativity, Materiality and Laboratory Practices in Artistic Wearables" at Concordia University where she teaches in the Department of Design & Computation Arts. She has curated fashion, design and media arts exhibitions and events at the 2010 Vancouver Winter Olympics; MuseumsQuartier, Vienna; V2_ Institute for the Unstable Media, Rotterdam; New Museum, New York; and the Musée National des Beaux Arts du Québec. Her fashion-tech and media designs have been featured internationally in festivals, galleries, museums and publications. She is the owner & designer at 3lectromode.com, a wearable electronics atelier dedicated to fashion-tech innovation. 3lectromode: Founded in 2010, 3lectromode is a Montreal-based wearable electronics atelier dedicated to avant-garde crafting and consulting in fashionable technologies. We develop small scale productions of techno-fashion garments and adaptable solutions for soft-wear designs.

TRITEX E-Learning Course on Smart Textiles

TRITEX

Carla.Hertleer@UGent.be

This e-learning course offers you a leap forward in your knowledge of smart textiles. The course is divided into two modules:

MODULE 1 - Functional and smart textile materials - describes the physical and chemical concepts of functional and smart textile materials. Explanation on working principles and practical examples offer you a clear insight in why and how these materials function.

MODULE 2 - Smart Textile Systems - is an advanced module describing the building blocks needed to develop smart textile systems. It explains in detail how to apply the materials from Module 1 to manufacture the components needed to come to a smart textile system. Additionally, pictures, schemes and examples are given to illustrate the components and their applications.

The e-learning course is available 24h/7 for a period of 12 months. During this period, you can interact online with the teachers of the course, through the forum or by e-mail. Finally, you can take a test per module in order to obtain a certificate of achievement.

Special conditions valid until June 30th 2013:

Module 1: 700 (no VAT) INTRODUCTORY PRICE*

Module 2: 700 (no VAT) INTRODUCTORY PRICE*

Module 1 + Module 2: 1000 (no VAT) INTRODUCTORY PRICE*

Each subscription entitles you to participate in one seminar and one workshop on the topic for free. These are included in your e-learning registration fee.

TRITEX
TRANSFER OF RESEARCH AND INNOVATIONS IN TEXTILES

The TRITex project (Transfer of Research and Innovations in Textile) is a collaboration between the Department of Textiles of Ghent University (Belgium) and the GEMTEX laboratory of ENSAIT (France). They are both internationally recognised for their research activities. Project actions are (1) exchange of researchers, (2) development of common research programs and (3) technology transfer to industry, mainly in the field of advanced textiles. Another central action of this project is to (4) develop e-learning modules on smart textiles. TRITex is an INTERREG IV project supported by ERDF. It aims at encouraging cross-border co-operation and bringing together researchers and industry from both countries.

Flexible Thermal Detector in Personal Protective Equipment for Fire-Fighters (INTELTEX)

Aurélie Cayla, Guillaume Lemort, Christine Campagne, Eric Devaux

aurelie.cayla@ensait.fr

This prototype is a part of the European research project INTELTEX ("Intelligent multifilament reactive textiles Integrating nano-filler based CPC-fiber") of the Sixth Framework Programme for Research and technological Development. The elaboration of the textile sensors is ensured by the incorporation of carbon nanotubes (CNT) in one or more polymers. The final goal of this work is to integrate in Personal Protective Equipment (PPE) for fire-fighters, a new textile composite bases on the use of innovative nano-fillers enables them to be alerted at a critical elevation of the surrounding temperature. The realization of this sensor requires the preparation of a biphasic Conductive Polymer Composite (CPC), where the two polymers have farther melting temperatures and one of which corresponds to the wished detection temperature. The CNT are introduced in the phase which is sensible to the temperature elevation (Polycaprolactone (PCL)) and protected by the second polymer whose melting temperature is higher (Polypropylene (PP)). Once the development step of the biphasic conductive multifilament (by melt spinning) reached, the yarn is embedded in an instrumented woven structure, which permits to record the electrical signal. The presence of an effect of Positive Temperature Coefficient (PTC) allows the detection at the melting temperature of PCL (58°C). The firsts prototypes studied under conditions closer to the reality show the reproducibility so that very promising results.

Aurélie CAYLA obtained her PhD degree in material science from University of sciences and technologies of Lille, France, in 2010. She held actually assistant professeur in the Engineering and Textile Materials laboratory (GEMTEX) of ENSAIT (Ecole Nationale Supérieure des Arts et Industries Textiles) in Dept. of the Multifunctional Textile Materials. Her research interests cover processing of synthetic materials by spinning applied to multifunctional and smart textiles (nanocomposites, materials from renewable resources).

HiVis Softshell Jacket with Integrated Heating System

Sioen NV, Apparel Division, Integration of Electronic Systems in Personal Protective Clothing

Vera.DeGlas@sioen.be

SIOEN

Protection through Innovation

The High Visibility Softshell jacket with integrated Heating System allows the end user to regulate his own temperature depending on the surrounding temperature.

Heating up large buildings (storage areas, open office spaces, etc.) is very expensive and cost a lot of energy. A possible solution, which is economic, environmental and wearer friendly, is the use of garments with integrated heating system.

The SIOEN Integrated Heating System can be easily integrated in different types of garments such as fleeces, softshell jackets, …

Furthermore the system is very lightweight and flexible, which results in an optional comfort for the wearer.

The power is given by 2 battery packs(Li-ion) per garment to heat the system. At full power, the battery can heat for approximately 2 hours; at 25% approximately 8 hours. Charging time of the battery is 2 hours.

The integrated Heating System has four levels:
25% - 32°C / 50% - 38°C / 75% - 43°C / 100% - 49°C

The system can be washed at max 30°C – without batteries

Sioen Industries is a diversified stock quoted group with an extensive portfolio of products and activities: spinning, weaving and coating, manufacturing of clothing, production of fine chemicals and processing of technical textiles. Vertical and horizontal integration, diversification and permanent growth have driven us since 1960.
Sioen Industries is:
- The world leader in coated technical textiles.
- Strong specialisation in high end technical apparel
- Specialist in fine chemicals
- Global player in the processing of technical textiles

HiVis Jacket with Integrated Light System

Sioen NV, Apparel Division, Integration of Electronic Systems in Personal Protective Clothing

Vera.DeGlas@sioen.be

SIOEN

Protection through Innovation

The High Visibility rain jacket with integrated LED System is complying with following European standards : EN340 / EN ISO 20471 / EN343. By integrating an additional LED-system into our garment, the user can light up the LED's if necessary, for example in an environment where objects visually compete.
The standard EN ISO 20471 describes three classes (three different minimum areas of retroreflective, fluorescent and/or combined performance materials) and depending on a risk assessment the user will select his type (class) of protective garment.
At night, the user is only visible due to the integration of retroreflective bands on the garment. The retroreflective bands are lighting up when lights (traffic lights or car lights) shine on the retroreflective bands? What if the lights aren't working, or if they are incorrectly adjusted? During the day the user is visible thanks to the fluorescent color. But what if there is fog or a lot of rain?

SIOEN integrated a LED system in this rain jacket to ensure visibility, to increase the level of protection (safety) of the user. The full Light System has in the front 6 white LED's and in the back 5 red LED's. The LED's are integrated in snap buttons in the retroreflective bands, powered by 3,7V/1400nAh Li-Ion battery.
Remark: a flashing mode is possible by adapting the software!

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- Global player in the processing of technical textiles

PeR+

Eva Deckers

e.j.l.deckers@tue.nl

PeR+, short for perception rug, is an interactive and intelligent carpet. It is sensitive to the activity of the person. Integrated sensing capabilities makes that the carpet detects it is being touched and whether pressure is applied. A body of light behaves in the surface of the rug. The light body can follow the person one to one or maybe it is somewhat shy and follows at a humble distance. PeR+ is an iteration on PeR. This first prototype is completely hand knotted and also the electronic components are integrated by hand. The prototype of PeR+ is made using existing manufacturing techniques. The threads that support the sensing and actuating capabilities are integrated in the carpet using the twining and tufting technique. The electronic components are all placed in a subfloor. This makes the carpet suitable to walk on and makes it possible to increase the scale of the prototype. The carpet portrays a high level of integrating material, technology and behavior. For more information, pictures and movies go to http://dqi.id.tue.nl/PeR.

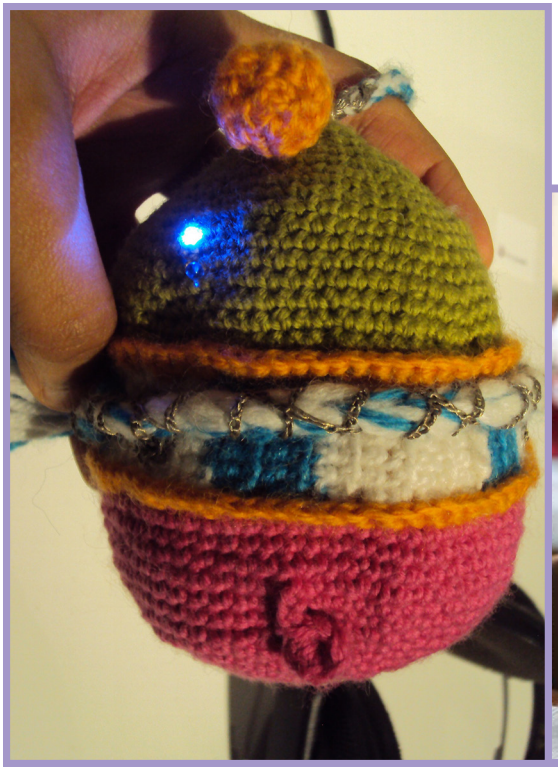
Eva Deckers graduated (cum laude) in June 2009 at the master course Industrial Design, Eindhoven University of Technology. As part of the course she studied at RMIT University Melbourne, Australia and she was an intern at A1-productdesign in Cologne, Germany. Her graduation project on how to design for perceptive qualities in artifacts continued in a three-year PhD project. She started the doctoral project after an around the world trip in April 2010. Her work is founded in the phenomenology of perception (Merleau-Ponty, 1945) and ecological psychology (Gibson, 1979). The work proposes a new perspective on forming and framing an artifact's intelligence from an action- and quality-centered perspective. During the three-year project she worked with an international flooring company to investigate the added value for design practice of the more theoretical findings of her work. The work on intelligent textiles was shown at several exhibitions. She strongly connected design-research and design-education and is an experienced lecturer and coach. She will defend her work in May, 2013. Since 2010 she is the chair of the Industrial Design alumni association, IDEa.

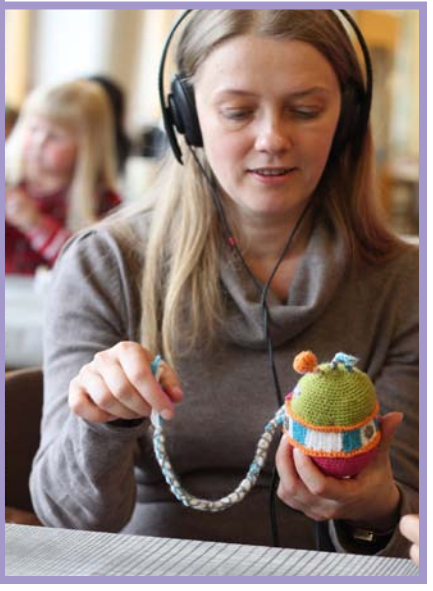
Soft Radio Series

Ramyah Gowrishankar

ramyah.gowrishankar@aalto.fi

Aalto University
School of Arts, Design
and Architecture





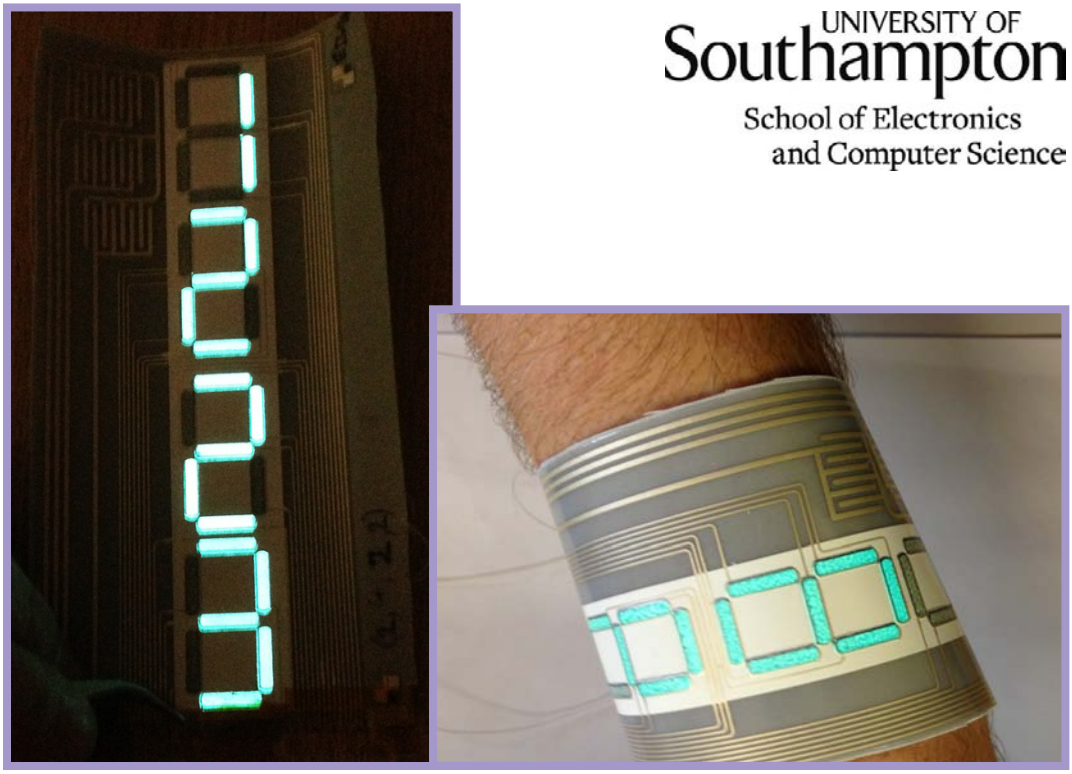
Soft radio is a crocheted spherical device that functions like a normal radio but uses textile-related actions (e.g. wrapping and twisting) as interactions to operate the radio. This prototype explores the opportunities for creating 'soft' digital interfaces by deriving interactions from the context of textiles and re-interpreting traditional craft techniques for incorporating electronics. The radio has a texture of any regular crocheted fabric and fits in the palm of one's hand. It has a loop on top that can be twisted to change between two modes: 'Volume' and 'Channel-seeking'. The values corresponding to the current mode (i.e. volume or fm band frequency) can be changed by wrapping the knitted chord around the crocheted sphere. The direction of the wrapping determines if the values are decreased or increased. It has 2 LEDs that visually indicate the states of the radio and a power switch made from a metal snap button. This project is a starting point to my doctoral research that, amongst other things, aspires to develop an interaction language specific to the new medium of e-textiles rather than borrowed from regular electronic devices.

Ramyah is a Doctoral Student at the Department of Design at Aalto School of Arts, Design and Architecture, Finland. She has a MA degree in New Media from Media Lab Helsinki, Aalto University. She is researching and working with e-textiles and wearables to explore the interactions and roles that emerge from integrating textiles and new computational devices, where handicrafts meet technology.

Functional Electronic Screen Printing – Electroluminescent Smart Fabric Watch

Marc de Vos, Russel Torah, Steve Beeby, John Tudor

mdv1g10@ecs.soton.ac.uk; rnt@ecs.soton.ac.uk



UNIVERSITY OF Southampton
School of Electronics and Computer Science

We have developed a prototype digital watch on fabric, which has been created using screen-printed functional electronic pastes to produce the world's first printed smart fabric watch. The watch is printed layer by layer using screen printable pastes with electronic functionality such as conduction, insulation and electroluminescence. The functional layers are screen printed directly on to the fabric to produce a 4-digit display each with 7 segments. Each display segment is lit using printed electroluminescent layers, which are powered by a bespoke flexible digital watch circuit and controlled using printed touch sensors. The printed watch is capable of displaying the time in hours and minutes and also has stopwatch capability. The prototype of the digital watch display segments is complete and successfully connected to the electronics. Improvements are ongoing to improve the durability of the connection to the electronics with the aim of printing the circuit board on the same fabric to eliminate the requirement for any connecting wires. The watch consists of 6 printed layers – a fabric interface to provide a smooth surface for subsequent prints, a bottom conductor, a dielectric layer, a phosphor layer to provide the electroluminescent effect and a top bus electrode and transparent electrode to allow the necessary field to be generated to light the display.

Marc de Vos is an MEng Electromechanical undergraduate student at the University of Southampton, this work is for his individual design project. He has been supervised in this work by senior researcher Dr Russel Torah and this work forms part of the research theme of Smart Fabrics at the University of Southampton headed by Dr John Tudor and Prof Steve Beeby.

Organic Photovoltaic Cells Integrated in Smart Shading

Pieterjan Aerts

pieterjan.aerts@howest.be

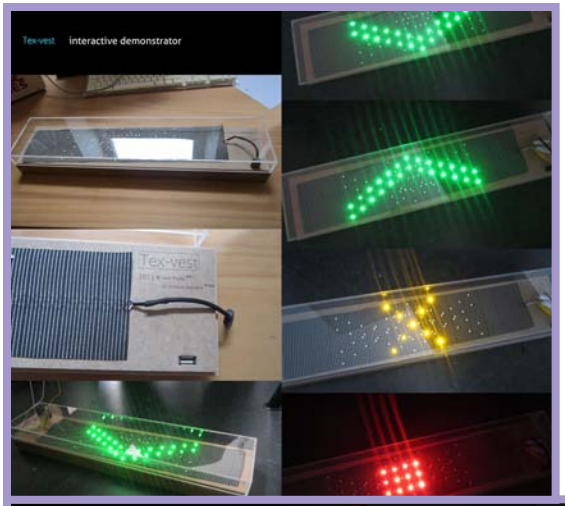
The indoor shading is integrated with organic, flexible and lightweight photovoltaic cells. Energy harvesting as a building integrated photovoltaic, and autonomous movement of the shading are the two main features which contribute to the added value of this smart shading. Controlling the movable shading results not only in an optimal angle for energy generation, but also in an automatic light and temperature control where the user still has the option to adjust the position of the shading to his wishes. Controlling the shading can also be done by linking it to a home automation system. Investigated types of shadings are the horizontal blinds as Venetian blinds or as a Duorol-system. A choice between these two variations will be made based on results of future tests such as connection test, user interaction tests and durability tests. This results in a smart textile which registers the amount of incident light and reads the adjustable preferences of the user, hereby autonomously adapting its position to regulate incoming light, temperature and generated energy. It also transmit this energy between the organic photovoltaic cells and the battery using electrodes embedded in the textile.

Pieterjan Aerts is currently a master student Industrial Design at Howest Kortrijk (Belgium) and develops shadings with integrated organic solar cells as an intern at Holst Centre – TNO. The presented prototypes were made in the framework of his Master Thesis and contribute to design-decisions on how to integrate organic solar cells in shadings. Pieterjan Aerts has a bachelor's degree on Mechanical Design- and Production technology.

Tex-Vest - Human Traffic Light

Jaka Plešec

jaka.plesec@gmail.com



weißensee kunsthochschule berlin

Tex-vest

titv

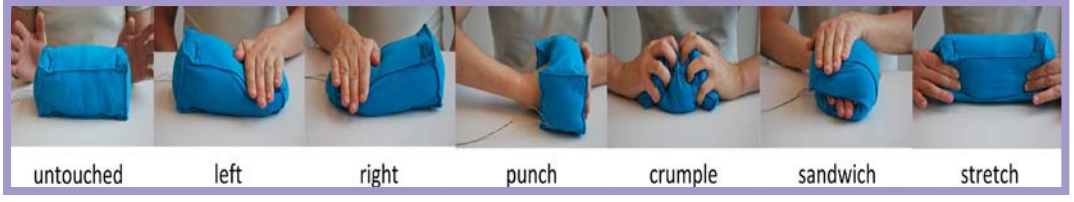
The traffic flow regulation is extremely dangerous for police men and rescue workers in cases of accidents on motorways. Darkness, fog and mist increase the risk by many times. The wearable electronic Tex-vest can clearly decrease these hazards. It is designed as an interactive police vest for a safe traffic flow regulation. Tex-vest makes traffic flow regulations of policemen and policewomen clearly visible even in the darkness and bad weather conditions. The police vest translates hand signals of the officer in to clear visible and understandable light signals. Users specific hand movements, where acceleration sensors are attached launch different animations like, flow of traffic arrows to the right or left, blinking stop and Stand by animation. Its fabric emits light via integrated LEDs of green, red and yellow color. Explanation of the innovation in relation to the state of the art The technical challenges of the project Tex-vest are the reliable textile integration from SMD-LED's driven by a commercially available controller in most simple way. We found the solution to this task in woven confection-able conductive backing fabric. For this purpose the following tasks were solved: 1. Hardware (Arduino Mega 2560), 2. Software development based on "Physical Computing", 3. Further optimization of the textile interdigital fabric, 4. System optimization of design and usability test (the choice of right combination of the components of the system and the further development of technical pattern and ergonomics) The three control lines made from ELITEX® yarns drive the SMD LEDs soldered onto the weft threads of the fabric. The electrical contact between a control line with its corresponding weft thread is created by a special Jacquard weave. With only three textile power supply lines we achieved a total of 6 patterns.

Jaka Plešec was born 1983 in Ljubljana, Slovenia. Graduated from product design (interaction design) by Prof. Carola Zwick at the Kunsthochschule Berlin Weissensee. His Project Tex-vest won "Avantex innovation prize 2011, Honorable Mention: Safety + Protection" at Techtextil in Frankfurt am Main, where it was also presented at Avantex Symposium 2011 Tex-vest was one of the winners of the "TRFC / VF Corporation Student Competition Event" at the MIT Media Lab, Boston, 2011. He works as a freelance designer and researcher and lives in Berlin.

Skweezees: Soft Objects that Sense their Shape Shifting

Luc Geurts, Karen Vanderloock, Vero Vanden Abeele

karen.vanderloock@groept.be



With Skweezees, we combine the idea of making input devices of everyday objects with the technology and aspiration of electronic textiles. In essence, a Skweezee is a deformable object, consisting of a soft, non-conductive, stretchy casing, and filled with soft, conductive, elastic stuffing. In our protypes, we used conductive wool consisting of steel fibers mixed with normal wool (Bekinox W12/18, www.bekaert.com). In order to detect the deformations, the Skweezees contain a limited number of (textile) electrodes that are dispersed over the shape. By measuring the resistance between any pair of electrodes, a number is obtained that is related to the magnitude of deformation between those electrodes. For every deformation, a different pattern of measurements is obtained, which allows the computer to distinguish different deformations. As a result, Skweezees can be programmed to recognize specific shape deformations; users can record their own squeeze gestures and these gestures are afterwards distinguished.

Karen Vanderloock, Luc Geurts and Vero Vanden Abeele are members of the e-Media Lab, a research group of Group T – International University College Leuven (Association KU Leuven). The e-Media Lab investigates novel ways of human computer interactions for applications with a serious goal, but that are also "fun" to play with, e.g. serious games. Karen holds a MSc degree in Electronic Engineering, and recently started a PhD at the e-Media Lab. Her research focusses on signal processing and machine learning for tangible, intuitive and interactive interfaces (TIII). These new ways of interaction are based on sensors, like commercially available touch screens, cameras and motion sensors, but also DIY sensors made from e-textiles.

Do You Feel Me? A Pair of Illuminative Smart Fashion

Jin Lam, Raymond Au, Clare Johnston, Gloria Wu

tcjinlam@polyu.edu.hk; tcaur@polyu.edu.hk; clare.johnston@rca.ac.uk; bobobabc@hotmail.com

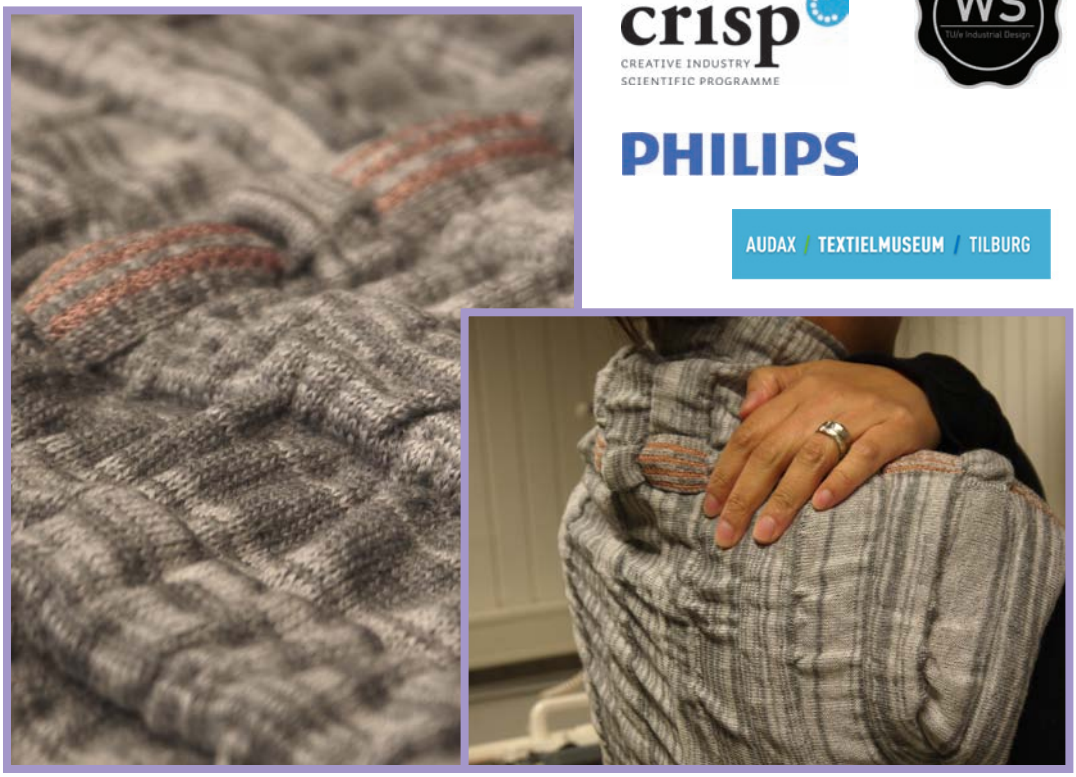
A pair of fashion prototypes that could react and present various visual communications regarding the changing environmental factors was created. Tailor-made electroluminescent panels, proximity, sound, heat, humidity and pressure sensors, and wireless communication devices were developed for these two prototypes. When prototype A sensed a object movement within 0.1m to 1.5m, its white electroluminescent panels started to flash and send a signal about proximity to prototype B. Then, prototype B's white electroluminescent panels were activated to flash. When prototype A sensed a yielding with a sound pressure greater than 50dB, its blue-green electroluminescent panels started to flash and send a signal about sound to prototype B. Then, prototype B's blue-green electroluminescent panels were activated to flash. When prototype A sensed a temperature above 40°C, its pink electroluminescent panels started to flash and send a signal about heat to prototype B. Then, prototype B's pink electroluminescent panels were activated to flash. When prototype A sensed the relative humidity greater than 80%, its blue electroluminescent panels started to flash and send a signal about humidity to prototype B. Then, prototype B's blue electroluminescent panels were activated to flash. When prototype A sensed an external force, its yellow electroluminescent panels started to flash and send a signal about pressure to prototype B. Then, prototype B's yellow electroluminescent panels were activated to flash. The developed prototypes were able to re-enforce people's sense of self, body image and presentation of oneself, and to also provide novelty in the field of contemporary high fashion.

Dr. Jin Lam is currently a Tutor of the Institute of Textiles & Clothing, The Hong Kong Polytechnic University. Her research interests include practising fashion design and developing wearable electronics for high fashion.
Prof. Raymond Au is the Associate Head and Professor of this Institute. His research interests include fashion design, fashion illustration, and fashion semiology.
Miss Gloria Wu is a PhD research student at this Institute.
Prof. Clare Johnston is the Head of the Textiles programme at the Royal College of Art and a consultant in colour and textile design for fashion and interiors.

Vibe-ing

Eunjeong Jeon, Kristi Kuusk, Martijn ten Bhömer, Jesse Asjes, Paula Kassenaar, Philips Research

m.t.bhomer@tue.nl; k.kuusk@tue.nl; e.jeon@tue.nl



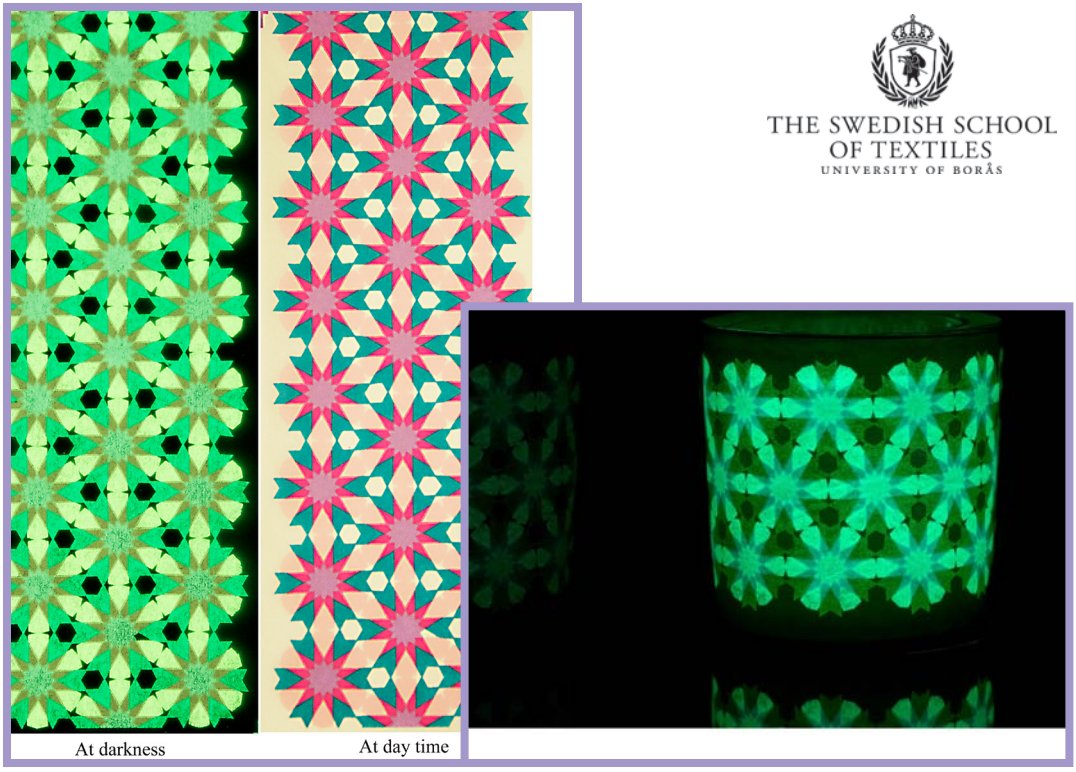
Vibe-ing as a care tool invites the body to feel, move, and heal through vibration therapy. Vibration has been used in numerous ways for therapeutic method: (1) for the improvement of bone density and muscle strength (Verschueren et al. 2004); (2) for the attenuation of delayed-onset muscle soreness (Lau & Nosaka 2011); and (3) for an increase of the speed of the blood flow through the body (Klima et al. 1991). Due to the fact of these beneficial effects on therapeutic method, it has been used in the treatment of osteoporosis, sarcopenia and metabolic syndrome etc. This design project contributes to the prevention of osteoporosis in older women and supports the need for their wellbeing. Vibe-ing is knitted using fully-fashioned technique. It can be worn various ways giving it a freedom to provide different stimulation areas on the same garment using technology and resources more efficiently. The garment contains multiple pockets with modular vibration and sensing (capacitive touch) PCB's which are connected by power and communication lines. This makes it possible to program the exact areas and way of stimulation on the body depending on the specific person's need for rehabilitation and healing.

Eunjeong Jeon is a Post Doctoral researcher, **Kristi Kuusk and Martijn ten Bhömer** PhD candidates in TU/e Industrial Design. They are members of Designing Quality in Interaction group and part of the Smart Textiles Services project that is part of Creative Industries Scientific Programme (CRISP). Eunjeong's research is based on comfort factors in terms of users' aesthetic experience, in particular, the multi-sensorial integration and kinaesthetic aspects of human activities and perceptions. Kristi's PhD research is about craft inspired Smart Textile Services for sustainability. Martijn's PhD research is on the changing role of the designer in multi-stakeholder design collaboration processes of intelligent products and services.

Dreaming-Vase

Marjan Kooroshina

Marjan.kooroshnia@hb.se



THE SWEDISH SCHOOL
OF TEXTILES
UNIVERSITY OF BORÅS

My research interest focuses on the exploration of design potentials of smart colors on textile, and documenting them as tools to facilitate the understanding and designing of dynamic surface-patterns. Dreaming vase is an object exemplifying my practice-based research project aiming to explore the creative design potential of mixing photoluminescent pigment with conventional textile pigment pastes in textile printing. The object is a two layer glass vase, inlaid with a printed surface-pattern that creates a two phase pattern; a pattern that can demonstrate an identical form at daylight as well as at darkness but with two different expressions. The Dreaming vase displays the development of dynamic surface-patterns, and the use of photoluminescent pigment in printing surface-patterns as it adds an extra quality to the object by emitting light without using any electricity

Marjan kooroshnia is a PhD student at the Swedish School of Textiles, University of Borås. Her research aims to explore the design potentials of smart colors on textiles and document them as tools for designing dynamic surface-patterns.

Houndstooth Shirt Version 2.0

Marie Olofsen

molo@itu.dk

The Houndstooth Shirt Version 2.0 is an exploration of the potential for wearables in mainstream fashion. The prototype is a black and white handprinted shirt in houndstooth pattern. The pocket of the shirt changes color from black and white to red and white if heated to more than 27 degrees Celcius. The heating happens via a heating pad placed inside the pocket, which is activated when the pocket is buttoned. The interaction uses a know feature of a shirt - the buttoning - therefore it is intuitive and the wearer is in control of the expression of the clothing. The interaction does not obstruct the function of the clothing because the pocket and the button is mostly an aesthetically and decorative element and not a functional one such as e.g. the buttons used for buttoning the shirt. The temperature of the heating pad is controlled via a temperature sensor, making sure that the temperature does not reach above 30 degrees, because this could potentially be unpleasant for the wearer. The system is controlled by a LilyPad Arduino and is powered by two 3,7V lipo batteries, which can be removed when the shirt is washed. The aim of the prototype is to open up and discuss an aesthetic and fashionable approach to mainstream wearables as opposed to for example a more functional approach.

Marie Olofsen holds a BA in Textile and Fashion Design and is currently pursuing her MSc degree in Digital Design and Communication from the ITU in Copenhagen, Denmark. With a hands on and practice based approach she works in the intersection of smart textiles, fashion design, communication design and interaction design. The Houndstooth Shirt Version 2.0 is part of her master's thesis. Website:www.marieolofsen.dk

Bedtime Stories

Kristi Kuusk, Unit040, Van den acker textielfabriek, Studio toer

k.kuusk@tue.nl

Bedtime Stories is a project developed further from earlier work called QR-coded Traditions. It consists of a set of bed sheets that have images woven into the fabric for children. The images are recognized by software and create interaction possibilities between digital and physical worlds, generations, past and future. It is a way to put the kid into the story creation to actually experience the fairy-tale. Personal values get transferred together with the cultural meanings. The prototype consists of a pillowcase and a blanket made from a durable textile that is designed and woven in the Netherlands and an accompanying i-pad to see the augmented reality hidden behind the layer of technology. The technology makes use of image recognition algorithms which make it possible to recognize certain patterns in the textile and images. When moving over the pattern with the camera of the iPad it is recognized and connected to certain objects in the story which are visualized in an augmented layer. Bedtime Stories is offering a new way to translate fairy-tale knowledge into people's personal experiences and pass that wisdom through generations. It is part of a research-through-design project that involves crafting methods and values in the environmentally damaging textiles and garments production, selling, wearing and disposing area. We have been "weaving" traditions together with digital technologies in order to make them longer lasting for a (environmentally, economically and societally) sustainable direction.

Kristi Kuusk is a PhD student in TU/e Industrial Design bridging textiles with technology. She's part of the Smart Textiles Services project that is part of Creative Industry Scientific Programme (CRISP). She has a MA in Fashion Design (Estonian Academy of Arts) and BSc in Informatics (Tallinn Technical University). Having practical experience in both fields she tries to merge the two otherwise separate and even controversial areas together in order to discover new opportunities for societally relevant applications in the emerging Smart Textiles field. She is interested in how crafts and craftsmanship can contribute to and inspire this.

Soft/Mesh

Olga Sjöroos, Jussi Mikkonen

olga.sjoroos@aalto.fi; jussi.mikkonen@aalto.fi

Aalto University
School of Arts, Design
and Architecture

The advent of rapid manufacturing methods gave new possibilities to the development and the concept of textile material. The key interest areas for using rapid manufactured textiles are seen as "high-performance textile market and the smart of intelligent textile market." It would seem that there is a missing combination of 3D-printing and fabrics, and for that end, naturally flexible materials should be explored thoroughly. By having a 3D-printed material as a relatively equal substitute to a fabric, the possibilities for prototyping and development might be increased. We have explored the possibilities of using 3D-printed soft materials as a hex-structure in different sizes, and created an embroidery with mesh to complement it. By starting with the combination of the naturally flexible 3D-printed material, we have stepped away from the rigid materials commonly seen in the 3D-printed garments. The work draws from the Department of Design research into soft materials, and augments existing garment manufacturing methods by using the 3D-print as a fabric.

Olga Sjöroos is a fashion design student at Aalto University, School of Arts Design and Architecture. She is interested in new materials and new structures, and likes to explore the unknown of the fashion and the technology.

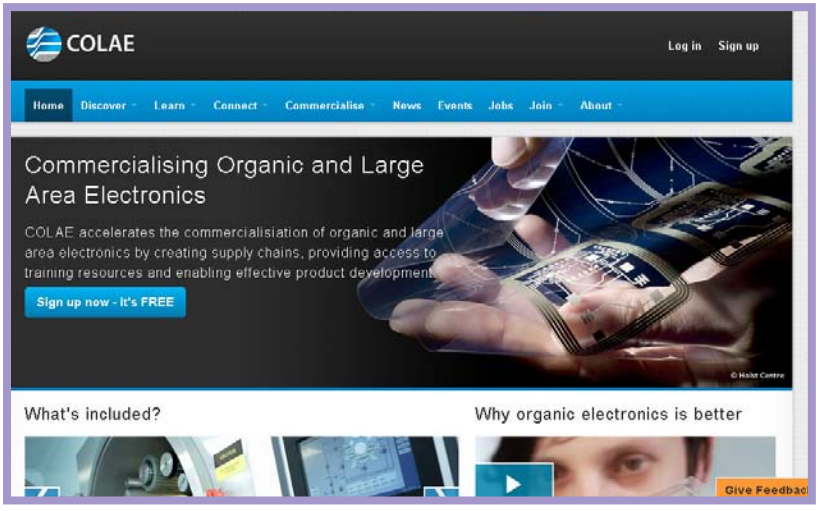
Jussi Mikkonen is a lab manager at the Aalto University, School of Arts, Design a nd Architecture. He is interested in research into smart textiles and soft materials, and translates the research results directly to the teaching and to applied use.

COLAE - Commercialising Organic and Large Area Electronics

COLAE, EU-Project FP7 Framework-Coordination Action

Lieva.VanLangenhove@UGent.be; Lina.Rambausek@UGent.be

COLAE
Commercialising Organic and Large Area Electronics



COLAE accelerates the commercialisiation of organic and large area electronics by creating supply chains, providing access to training resources and enabling effective product development. COLAE aims to raise awareness of the diverse range of applications utilising OLAE technology and to reduce the delivery time to market of these products while demonstrating the major business opportunities that can be explored and exploited, especially for SMEs across Europe As the organic and large area electronics market continues to grow and evolve at speed through the promise of new products, developed with lower cost, low energy processes using environmentally friendly materials, COLAE will provide European organisations access to an unparalleled knowledge base and the know-how to implement OLAE technology. COLAE has harnessed the resources and expertise of its project partners and made it available to both the existing organic electronics industry and new organisations entering the market. Members can access high quality training and workshops, technical and business feasibility support, the best pilot production and manufacturing facilities, as well as gaining an opportunity to create regional clusters. The project aims to connect all players within the industry to create and develop a dedicated supply chain that delivers tangible value and benefits. In addition, COLAE is focused upon engaging with end-users of the technology and raising awareness among manufacturers of the potential applications of organic and large area electronics.

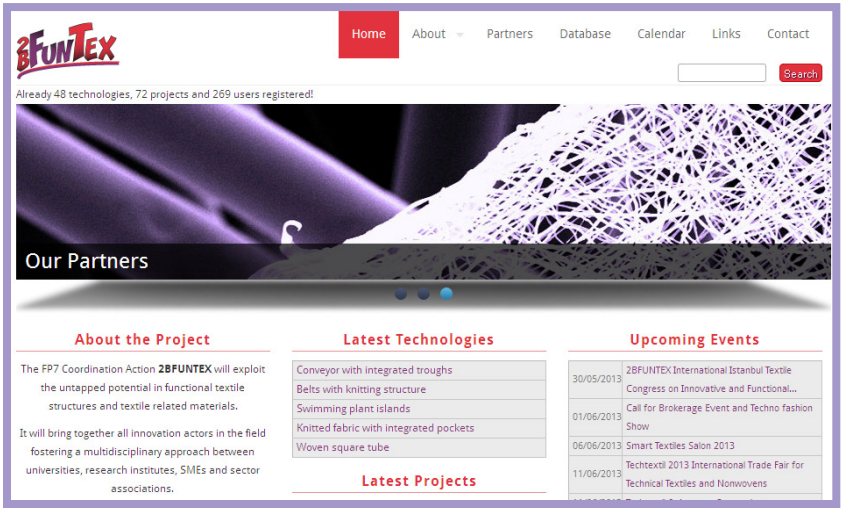
COLAE
Commercialising Organic and Large Area Electronics

Europe's leading organisations have united to form **COLAE** – Commercialisation of Organic and Large Area Electronics – a project designed to simplify and speed up the commercialisation and adoption of organic electronics technology through the creation of industry clusters. All 18 partners are committed to working together to develop and produce world class solutions for the benefit of all European businesses and organisations that are currently or could in the future utilise OLAE technology. Through the creation and promotion of regional clusters – a regional cooperative entity with research, industry and government representation – represented by one of the project partners, COLAE will facilitate the sustainability of a strong European OLAE industry.

2BFUNTEX-Boosting collaboration between research centres and industry to enhance rapid industrial uptake of Innovative Functional Textile Structures and Textile related Materials in a Mondial Market

2BFUNTEX, EU-Project FP7 Framework-Coordination Action

els.vanderburght@UGent.be; info@2BFUNTEX.eu



The European Coordination Action 2BFUNTEX wants to bring together all innovation actors in the field to exploit the untapped potential in functional textile structures and textile related materials by fostering a multidisciplinary approach between academia and industry.

Main objectives :

- To be the market place for all stakeholders involved allowing the traditional textile sector to move away from more traditional products to speciality products manufactured by advanced flexible high technology, knowledge based new fabrics and specific applications. 2BFUNTEX wants to be the framework for the EU27 stakeholders for actions in research, education and technology transfer in order to improve the competitiveness of the textile and associated European industries.
- To develop a platform for actions in research, education and technology transfer in the field of functional textiles to have the textile industry transformed into a dynamic, innovative, knowledge-driven competitive and sustainable sector.
- To enhance transfer of the knowledge available at universities and research institutes to industry to favour rapid industrial uptake.
- To support research and industrial innovation actors in their efforts to define joint research projects and actions.

The Open Innovation Platform www.2bfuntex.eu is meant for companies to detect new technologies and business opportunities and to express their needs, and for research organisations to present their research and education and available technologies.

The **2BFUNTEX** consortium includes 26 partners from 16 European countries. They represent a balanced mix between nationality (of great importance for the collection of information on national/regional projects, dissemination to local industry), technical expertise, market expertise, size (large enterprise and SME, but also small research groups and large groups) and type (research institute, university, industry, SME). Within this consortium complementarity is achieved on the specific level of type of research regarding both textiles and materials research disciplines (surface engineering, coatings, ceramics, composites/plastics, manufacturing processes, industrial and/or engineered polymers, …). Further, an Industrial Advisory Board (IAB) is set up to validate the strategy and progress of the project and give information on the industrial needs in the field of functional textiles and textile related materials. This IAB includes both large companies and SMEs at different levels in the value chain.

SYSTEX - Coordination Action for Enhancing the Breakthrough of Intelligent Textile Systems (e-textiles and wearable microsystems)

SYSTEX, EU-Project FP7 Framework-Coordination Action

Lieva.VanLangenhove@UGent.be; Lina.Rambausek@UGent.be

SYSTEX aims at collecting technological and non technological information on relevant projects at various levels and classifi es them in a transparent knowledge based information platform, structuring the relevant data of the entire e-textiles value chain according to the requirements of the interacting partners. The analysis of the available and ongoing research activities in e-textiles and wearable micro systems and the respective results will be edited in the framework of an interactive website and thus enhance cross-sectoral synergies and speed up the exchange of project results. Access to this new data pool shall be a true added value for every party involved in intelligent textile systems and off ers a clear competitive advantage. The objective of SYSTEX is to identify the hurdles in the interdisciplinary knowledge transfer and to initiate actions to overcome them.

Systex has a strong market-driven focus and is geared to foster cooperation between the diff erent knowledge carriers: industry, academic, government institutions, research & development and users of the technology.

SYSTEX aims at developing a framework for current and future actions in research, education and technology transfer in the field of e-textiles and wearable microsystems in Europe to support the textile industry to transform into a dynamic, innovative, knowledge-driven, competitive and sustainable sector. Further information about the SYSTEX project and its activities can be found on www.systex.org.


systeX

SYSTEX STUDENT AWARD 2012

And the winner is …

UNLACE: Interactive Lace Lingerie

Eef Lubbers

e.lubbers.1@student.tue.nl

Unlace is an interactive lace lingerie garment which allows partners to connect by becoming more aware of touch, time and warmth. The man's touch on the woman is sensed by the garment, after which the surrounding threads slowly heat up and change from black to skin color, 'undressing' the woman and guiding the man's hand to another spot to touch. The slow change in 'transparency' and warmth increases awareness of touch and creates time to explore the woman's body together.

The old craft of bobbin lace making was the inspiration and technique used in this project. The garment is made in one piece and shaped as a women's body. Skin colored threads were painted with black thermo chromic ink. Inside the threads conductive thread is integrated. When touching the garment the conductive thread heats up and changes the color of the surrounding threads to skin color. Based on the transparent property of lace the concept still holds the value of the traditional craft besides the technique. Bobbin lace making is used in a modern way by changing the scale and using smart materials, making it into something much more than just a decorative piece. It is an example of what can be developed when an old craft is revived by a new generation living in the digital revolution.

Eef Lubbers developed Unlace for her final bachelor project and received her Bachelor degree Industrial Design at the Eindhoven University of Technology (TU/e) in 2012. She continued her study at the TU/e and is currently a master student Industrial Design. With her interest in fashion and technology she is specializing in the field of smart textiles and intelligent fashion. Her work is characterized by the combination of aesthetics and simple electronics resulting in which she refers to as 'delicate technology'.

Nominated for the SYSTEX Student Award 2012:

Ahsen Khan

University of Boras, Sweden
"Dyeing of Wool and Silk Fibres with a Conductive Polyelectrolyte and Comparing Their Conductance"
ahsen.khan84@gmail.com

Courtney Musciano

North Carolina State University, USA
"Project to create a highly hydrophobic and breathable textile that utilizes silicone"
cjmuscia@ncsu.edu

Eef Lubbers

Eindhoven University of Technology
"Unlace - Interactive Lace Lingerie Garment"
e.lubbers.1@student.tue.nl

Leonie Tenthof van Noorden

University of Technology Eindhoven
"Techcrafts"
l.s.tenthof.van.noorden@student.tue.nl

Synne Geirsdatter Frydenberg

Interaction designer, Making Waves, Oslo
"Freke - an intelligent training experience"
synnefrydenberg@gmail.com