SMART TEXTILES SALON

Vol. 4

Prototypes on Stage, 25 June 2015
Ghent University, Ghent (BE)

PROCEEDINGS

Welcome!

Lieva

Carla

Sheilla

Lina

The Smart Textile Salon is having its fourth edition. The first edition evolved from the European coordination action SYSTEX as one of the solutions to foster the commercial breakthrough of smart textiles.

Smart textile prototypes are the core of this event. We want to give designers, researchers and industrialists the opportunity to experience working prototypes, to see and feel, to discuss on achievements and challenges.

Demonstrating smart textile prototypes on stage has proven to contribute to the success of smart textile research and development. Whereas research is still working on basic themes like conductive materials, energy scavenging and storage and data processing, some products are already on the market. Also, a lot of development work has been done for smart protective clothing, such as fire fighter suits. These markets however are ruled by public procurement, thus to enter them innovative procurement procedures are being designed. In addition standard test methods are being set up as well. So step by step smart textiles are becoming the commercial success that was forecasted more than a decade ago.

This year's edition links up with the Flemish project SMARTPRO. This project targets the development of industrial smart textile prototypes in the areas of protection, care, entertainment and transportation. It shows the maturity of smart textile developments has reached the stage of convincing the related industries (textiles and ICT) of the technological readiness level.

Just like previous edition we can enjoy the beautiful building of MIAT, the Ghent Museum for Industrial Archaeology and Textiles, a former textile factory.

I want to thank all participants and presenters for joining our event and I wish you all an inspiring experience.

Enjoy the workshop!

Lieva

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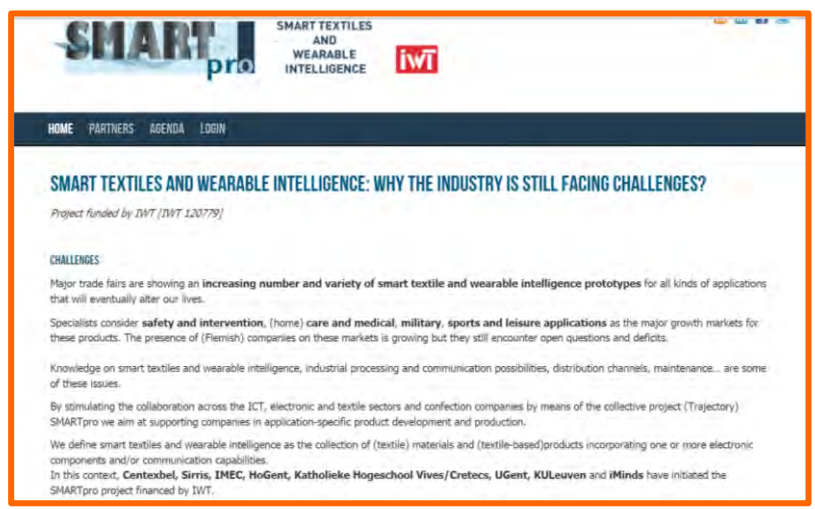
SMARTpro

www.smart-pro.eu

Smart Textiles and Wearable Intelligence
From intelligent prototype to industrial and practical products



iwt

CENTEXBEL

sirris
driving industry by technology

imec

HoGent

UNIVERSITEIT GENT

iMinds

ReMI Reliability in Mechatronics and ICT
KU LEUVEN

CRETECS
expertisecentrum zorgtechnologie

SMARTpro defines smart textiles and wearable intelligence as the collection of (textile) materials and (textile-based)products incorporating one or more electronic components and/or communication capabilities.

The SMARTpro project focuses on the industrial development of smart textiles and wearable intelligence in four application areas: safety and intervention, (home) care, sports and leisure, technical applications. Because specialists consid-
er them as the major growth markets for these products.

The presence of (Flemish) companies on these markets is growing but they still encounter open questions and deficits.
Therefore, we choose to work exclusively with reliable and modular electronic systems and software. We are building on the knowledge already acquired in many European and other R&D projects.

Complex systems are therefore avoided. “Keep it simple” and “less is more” are guidelines determining the selection of e-systems and industrial application or assembling techniques.

By simultaneously engaging the end-users and other actors (care providers, sports clubs, security services, intervention services, laundries, recycling companies…) in the project, we are also focusing on the users’ specifications and needs in the different application fields.

Prototypes on Stage

ComfiSense

Mahmood Ahmed

mahmoodahmed@outlook.com

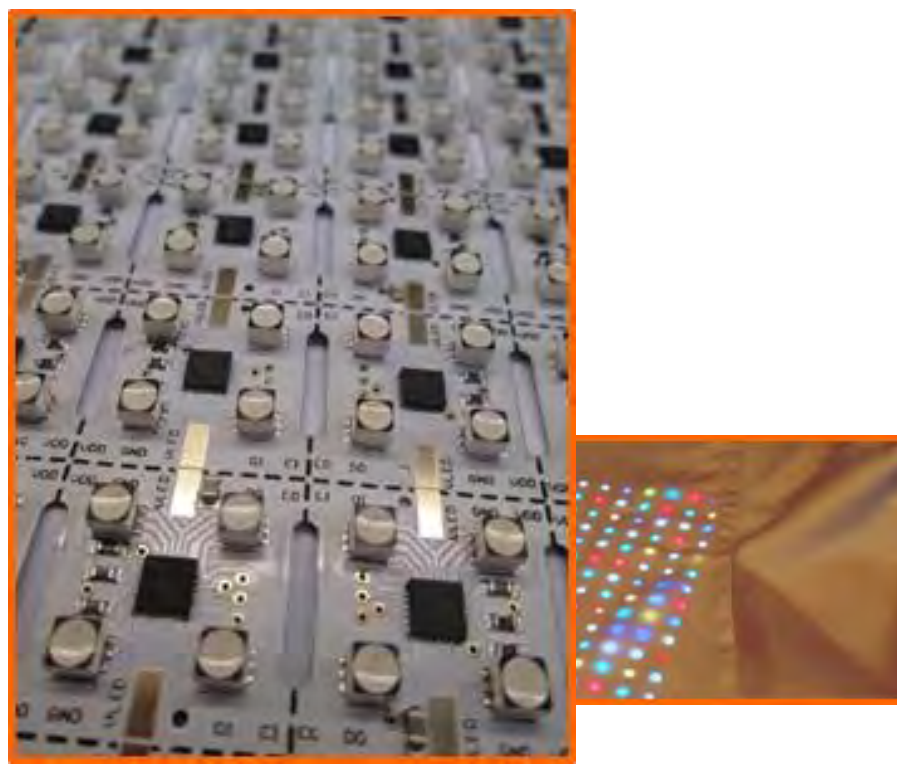
Clothing serves a multi-functional role in human life and the proper choice of clothing affects human performance, comfort and wellbeing. While selecting clothes on the basis of fashion or visual appeal might be easy but their selection for achieving thermo-physiological comfort is not always obvious, especially in unpredictable weather situations. Comfort in general and Thermo-physiological comfort in particular is a highly complex, multivariable and to a large extent a subjective issue.
ComfiSense is an innovative system to help the average consumer choose the right apparel for thermal comfort according to specific climate, activity and usage scenario. Properties of the clothing relevant for thermo-physiological comfort are stored onto RFID/NFC tags. The tags could be integrated into the clothing as a yarn in the fabric or attached as labels on the garments. An NFC enhanced smartphone reads the clothing data from the tags. A companion application on the smartphone utilizes this information along with the environmental variables to determine the comfort. It also acts as a user interface to predict the thermal comfort of the clothing selected by the user or can give suggestions for what to wear in the given environmental conditions and the type of activity. At present the system can be utilized for evaluating clothing comfort in indoor environments. Future extensions of the system will focus on different scenarios in outdoor conditions.

Mahmood Ahmed holds a Bachelor's degree in Textile Engineering from Pakistan. At present, he is pursuing an International Master in Textile Engineering at Ghent University Belgium. The above mentioned prototype is part of his master's thesis related to RFID technology for enabling smart applications in clothing & textiles. This research focuses on the potential of RFID/NFC tagged clothing for context awareness, ubiquitous computing and smart human interfaces.

Dress Code

Kristof Buntinx, LuxLumen, UGent

kristof@kristofbuntinx.com

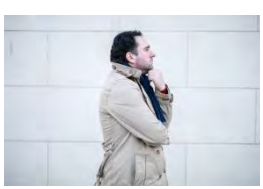


The real Dress Code – *the dress with moving images* – will only be revealed next year, however, here is a preview.

Dress Code will not just be an illuminating dress, it will show moving images. Images can express emotions, feelings, love, rhythm, beauty. It will be up to the wearer of the dress to decide what images are revealed.

The technology to do this is based on off-the-shelf components. The presented prototype shows the modules that will be used to create the moving images in the dress. It is designed and manufactured by the Flemisch company LuxLumen in such a way that it allows a high degree of shaping and flexibility.

Dresscode is a CiCi (Call for Innovation by the Creative Industries) project supported by IWT, Flanders agency for Innovation by Science and Technology.



Brussels designer Kristof Buntinx created furore with his God Save the Queens shirts and gained international fame with a boxer short collection with which he targeted Russian anti-gay laws. Protest and irony are therefore no strangers to Buntinx, but he also dresses Belgian celebrities in little bespoke gems just as much as he has children photographed as superstars. The exiled Sint-Truiden native has been working under his own label for more than a decade.

Kristof Buntinx certainly aims to let his designs speak for themselves.

Fully printed smart insole for wireless biofeedback during rehabilitation and training

T&T medilogic MEDIZINTECHNIK GmbH

Wim Christiaens and Robert Janz

wim.christiaens@quad-ind.com and janz@medilogic.de

This smart insole is based on direct integration of a capacitive sensor into textiles. The production process is based on screen printing a combination of Ag ink with carbon ink, directly onto the textile substrate. Suitable textile materials with requested properties were compared and evaluated in combination with appropriate conductive inks towards printability and optimal adhesion strength. The insole build-up consists of 3 different conductive layers processed on the same surface. These layers are ultimately combined through folding them as a multilayer stack. Individual layers are electrically isolated using dedicated dielectric spacer materials and proper adhesives. Reliability testing including durability tests have been passed successfully. The functional system consists of the monitoring insole, connected to a portable electronic signal unit. This signal unit is then attached with a Velcro strip to the patients lower leg.

Main areas for application: as an indicating system for sensitization of the lower extremities, the medilogic® biofeedback system "Belamed" finds its task in the field of rehabilitation and training for reducing capacity overload after operation. Following accidents or surgery it is often necessary to limit the load on the patients' leg during the healing process to avoid damage during walking. On the other hand a limited and well defined amount of load during early mobilization helps the healing process. A compromise is a partial load on the leg with walking aids.

Wim Christiaens obtained his PhD in electronic engineering from Ghent University (B) in 2009 for his work on the integration of passive and active components inside flexible circuit boards.
After his PhD he was appointed as business developer for a consortium of 9 Ghent University groups, combining their expertise in the area of wearable/implantable electronics. In June 2011 he joined ACB, a Belgian printed circuit board manufacturer, where he coordinated different capability projects in production and also became product engineer, serving as technical contact for the customers providing technical advice, DFM (Design For Manufacturing) and NPI (New Product Implementation) services.
In October 2014 he joined Quad Industries as R&D director to coordinate all innovations with a strong focus on exploring new technologies and applications in the field of (screen)printed electronics.

SMARTpro

Mark Croes

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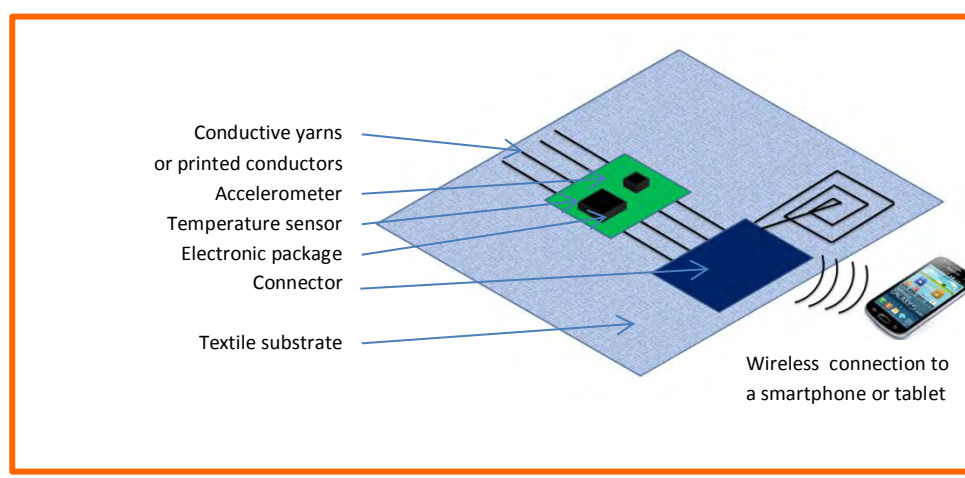


The SMARTpro project focuses on the **industrial** development of **smart textiles and wearable intelligence** in four areas: safety and intervention, (home) care, sports and leisure and technical applications.

Therefore, we choose to work exclusively with reliable and modular electronic systems and software and we are also building on the knowledge already acquired in many European and other R&D projects.

Complex systems are therefore avoided. "Keep it simple" and "less is more" are guidelines determining the selection of e-systems and industrial application or assembling techniques.

By simultaneously engaging the end-users and other actors (care providers, sports clubs, security services, intervention services, laundries, recycling companies…) in the project, we are also focusing on the users' specifications and needs in the different application fields.

Together with members of the user group we are working on the development of four demonstrators based on the value chain present in the SmartPro user committee.

SMARTpro is a VIStraject supported by IWT, Flanders agency for Innovation by Science and Technology.

Marc Croes is consultant in Hygiene and Medical at Centexbel.
He is project coordinator of the SMARTpro project with Centexbel, Sirris, IMEC, iMinds, HoGent, UGent, KHBO, KULeuven and iMinds as partners.
The SMARTpro user group comprises over 30 companies.

Active ventilation topper “Climate”

Liselotte Debaere and Peter Hostyn

peter.hostyn@desleeclama.com

You want the perfect temperature for your 3-minute shower at 38°C. So don't settle for less for your 7-hour sleep! A unique topper with an active ventilation system Research has shown that the ideal sleeping temperature is 30°C. This temperature guarantees the ideal microclimate to enjoy an undisturbed sleeping experience. With the active ventilation system called Climate®, this temperature is guaranteed during the whole night, just like the quality of your sleep. The Climate® topper is a smooth and soft mattress topper With an ingenious ventilation system inside, which measures the body temperature and the humidity. Depending on the personally selected comfort mode, integrated micro fans will evacuate the excess heat out off the 3-dimensional spacer layer at the top. The temperature and humidity will be balanced until the comfort settings are reached. This automatic-regulating active ventilation system is integrated in a high standard premium mattress topper. Once someone gets into his bed, the system turns on automatically in an absolute discrete way. Climate® comes with a nicely designed control unit which allows to choose your best fitting comfort mode – "Fresh", "Comfort", "Relax" or "Warm" – depending on your personal preferences and desired sleeping climate.

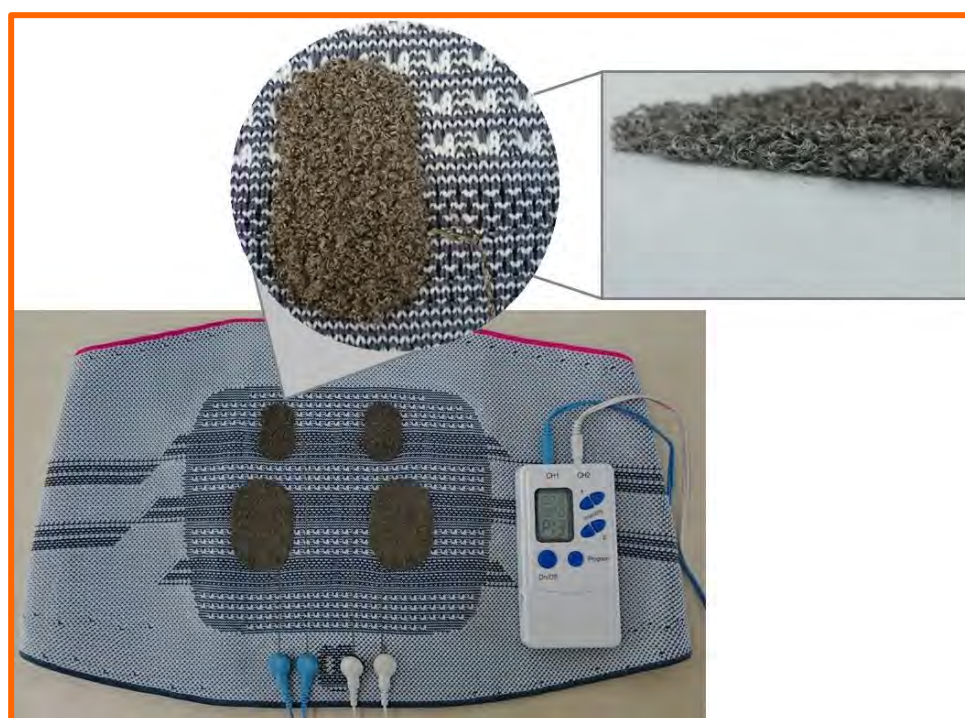
www.desleeclama.com

Liselotte Debaere IDC " innovation and Design Center" at DesleeClama

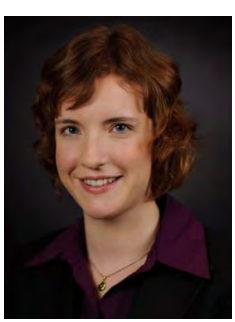
Lumbar bandage with moss-embroidered electrodes for electrostimulation

Melanie Hörr, Meike Reiffenrath

melanie.hoerr@ita.rwth-aachen.de and meike.reiffenrath@ita.rwth-aachen.de



The prototype is a lumbar bandage with moss-embroidered electrodes used for electrostimulation of the lower back. It is connected to a conventional TENS unit (Transcutaneous electrical nerve stimulation) which provides the electrical current for the stimulation. The lumbar bandage can be used for non-invasive nerve stimulation to reduce acute as well as chronic pain.
Moss embroidery is a special embroidery technique which uses only one thread. If a conductive thread is used, moss embroidery creates a three-dimensional conductive structure which can be used as an electrode for body signal monitoring or for electrostimulation. The structure achieved by moss embroidery provides better skin contact than flat embroidered electrodes. This is particularly true for hairy areas of the body like the scalp or men's arms, legs and chest. Another advantage of this three-dimensional structure is that due to the contact pressure, the surface of the electrodes adapts to the skin and the body geometries. This ensures good skin contact and makes the electrodes comfortable to wear. Due to the special geometry of the moss-embroidered electrodes a high surface conductivity is achieved. For the prototype, the electrodes have been embroidered directly onto a lumbar bandage using conductive yarn Shieldex 110/34 dtex 2-ply (Statex GmbH).



Melanie Hoerr is a PhD student at Institut fuer Textiltechnik of RWTH Aachen University, Germany. She received her diploma degree in Mechanical Engineering from RWTH Aachen University in 2010 after finishing her training as industrial mechanic (specialty operating technology). Since 2011 she is working as a research assistant in the area "Medical Textiles" at the Institut fuer Textiltechnik, RWTH Aachen University. She is the head of the research group "Medical Smart Textiles".

Royal College of Art
Postgraduate Art and Design

Peacock

Myrto Karanika

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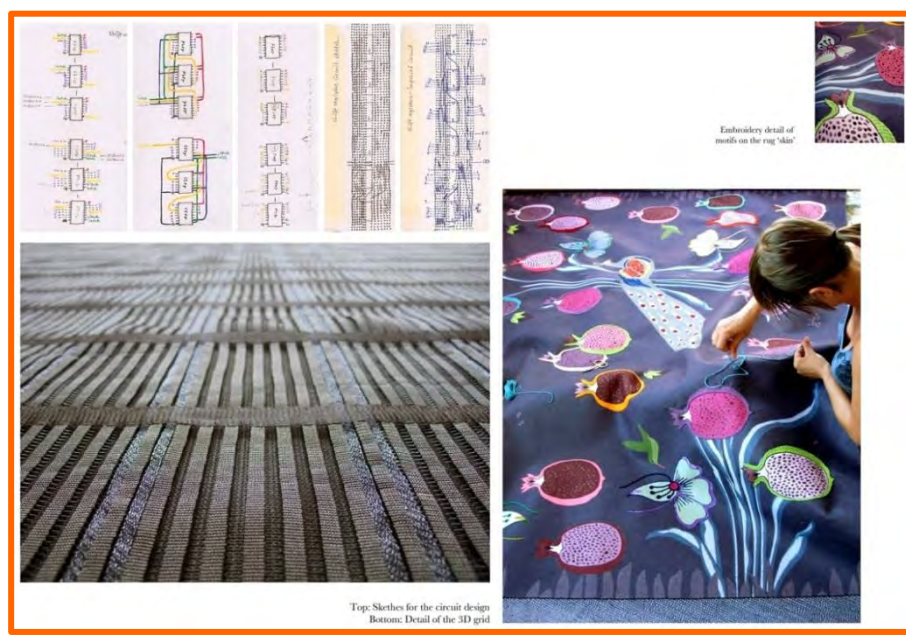


Peacock is a responsive rug that is 1.60 x 2.40m in size. Its design involves a 3D conductive grid that is embedded in its underlay. The grid is connected to a sound engine through a complex of shift registers which are in turn connected to an Arduino. This technology allows the rug to act as a soft, tactile, numerical interface that has the ability to track people's movement on it, and to sonically respond to it by generating an organic soundscape that evolves over time with respect to people's unique interactions. People are invited to remove their shoes and spend time on the rug (playing, walking, crawling or simply laying down and relaxing), and to explore the relation between their performed activities and the generated soundscape.

Materials: spacer fabric, conductive mesh band, felt, various electronic components, various threads, Arduino microcontroller

Software: Arduino, SuperCollider

Peacock was developed as part of my practice-based PhD on perception that is conducted in the Textiles Department of the Royal College of Art.

Myrto Karanika is an architect and an artist. She holds an AHRC funded MFA in Computational Studio Arts from Goldsmiths University of London, and is currently a PhD candidate at the Royal College of Art.

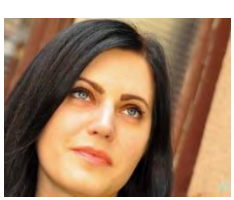
Myrto's artistic practice touches upon a variety of fields such as spatial design, responsive art, textile art, sound art and biology. Combining the use of soft technologies with traditional art practices like illustration, printmaking, stitching and embroidery, she creates textile-based responsive installation pieces that seek to unravel aspects of perceptual activity and bodily engagement mainly within the context of spatial experience. Her work has been presented and exhibited in a variety of different public contexts across the UK as well as in Greece, Italy, Brazil and Romania.

Smart LED dress

Daniela Kovacevic (LENA DKM)

Lenathemil@gmail.coml

The dress I am submitting here as a realisation of the model on a given subject was made of the American linen, and has built-in white-ish LEDs in the upper part. Those LEDs are programmed by three micro controllers, and are powered by a 12V battery with a switch to turn on and off the LEDs. The development of textile technology has reached such level that the electronic devices can now be inserted into the textiles, which makes them, not just wearable like other clothing, but they have local monitoring, counting and wireless communication. Such Smart clothes are known as electronic textiles, and they found their application in various fields- from civil, to medicine, to military, etc. I have to mention contemporary designers who are using a meaningful combination of technology and style in their work. The most interesting of them all is a London-based designer of Turkish origin, Hussein Chalayan, whose work inspired me to realise the LED dress. Also there are Susan Li, Rainbow Winters, Mary Huang and others.



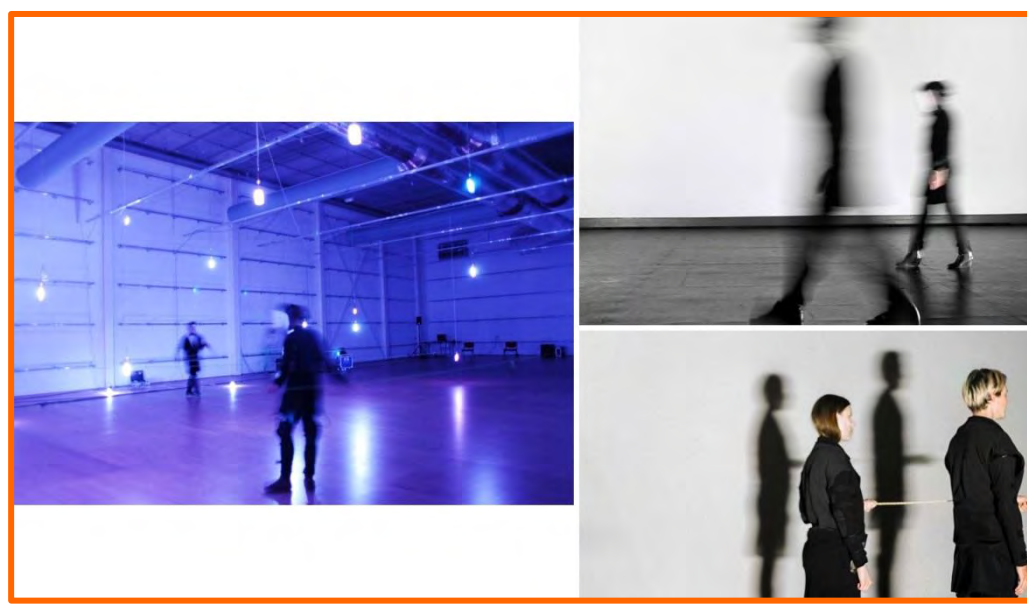
Daniela Kovacevic, art name: Lena Daniela Milivojevic (LENA DKM), born 1985.
Education at The College of Textile-design, Technology and Management -DTM, Belgrade, Serbia.
Student in Specialized vocational studies - Clothing for special purposes, 2nd level (2014.-present);
Basic vocational studies, Department for design of textile and clothing, 1st level (2009.-2014.)

In my spare time I enjoy music, singing, painting, photography, reading, writing, physics, astrology, numerology and people say I am a multi- talented person.

ILINX

Valérie Lamontagne, Chris Salter and TeZ

valerie@3lectromode.com



Ilinx is a performative wearable provoking an intense bodily experience that blurs the senses of sight, sound and touch. Presented within an the environment, a group of four visitors at a time wear specially designed garments. These wearables are outfitted with various sensing (movement) and actuating (30 vibro motors) devices that enable visitors to interface with the performance space. During the event, a ritualistic progression which lasts approximately twenty minutes, the natural continuum between sound and vibration, vision and feeling becomes increasingly blurred, extending and stretching the body's boundaries beyond the realm of everyday experience. The project is inspired by work in the area of what is called sensory substitution – the replacement of one sensory input (vision, hearing, touch, taste or smell) by another, while preserving some of the key functions of the original sense.

Valérie Lamontagne,
Valérie Lamontagne is a digital media artist-designer, theorist, curator, and PhD scholar researching "Performative Wearables: Bodies, Fashion and Technology" at Concordia University where she also teaches in the Department of Design & Computation Arts. She is the owner & designer at 3lectromode, and founder-director of Agence Simultané, a post-digital incubator and creation lab, as well as sitting on the editorial board of the media arts magazine Etc. Média. She also holds the position of Creative Lead at Cirque du Soleil's C:Lab since 2015. Valérie's work focuses on frameworks combining human and non-human agencies that when combined with unorthodox material and aesthetic innovations produce rich experiences.

Red Perception

Galina Mihaleva

gmihaleva@ntu.edu.sg

Red Perception is an interactive dress that provides a multi-layered experience that works with the synesthetic perception of movement. Acting on the physical-perceptual aspects of the movimentation of the skirt made from synthetic textile the interaction occurs through desires and temporalities on an organic web of certain compositional unpredictability, bringing audiovisual feedback as return. A playful environment of discovering meanings is built, where the output poetically weaves a relational communication to both the interactor's movement and the system's lines already modified by past interactions, turning visible multiplicity itself. In that way the space is hybridized, so that the virtual seems to gain the time of the actual inserted between the gap of the tangible and the intangible, bringing new ways of feeling and acting to surface. Tangible dimension of Red Perception, the Instrument is a textile interface, an open hardware that has open purpose and usage, being able to be freely folded, twisted, tightened and manipulated in various contexts to generate real time digital data of its movement. This project is a collaborative effort where the instrument originally designed for the interactive installation of Nama from Luiz Zonatello.

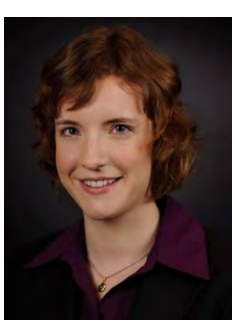
Galina Mihaleva is a Bulgarian-born designer. After graduating a Master degree in Textile Design she decided to further her studies following a PhD program in Fashion Design and Technology at the Academy of Fine Art in Sofia.
Her interest in fashion lies in exploring the extent to which we experience fashion (emotional, intellectual and sensual aspects) and how we might be able to accomplish a higher state of connectivity between the body and our clothing.
Her design work has been shown in galleries and museums across United States, Asia, Central and South America and Europe

Textile-integrated GPS-Receiver

Meike Reiffenrath and Kolja Vornholt

meike.reiffenrath@ita.rwth-aachen.de and kolja.vornholt@rwth-aachen.de

A textile-integrated GPS (global positioning system) receiver offers the possibility of localising the wearer. This can be used in the fields of sports or leisure time for the monitoring of routes as well as in the field of medicine for the localisation of injured people or people with certain disabilities. The textile-integrated GPS receiver consists of a purely textile circular polarized microstrip patch antenna connected to conventional electronics. This combination of textile and non-textile components offers several advantages: The textile GPS-antenna can be located in the shoulder or neck region for good direct view towards the satellites without impairing the wearing comfort. The conventional electronics are reliable, easy to get and offer good functionality. They can be integrated in places where they do not have a big influence on the wearers comfort such as the lower region or inside pockets. The antenna's conductive patch and groundplane are made from woven, silver-plated polyamide with an additional copper coating (Shieldex Kassel, Statex GmbH, Bremen) whereas the non-conductive substrate is made from a polytetrafluoroethylene (PTFE) non-woven (Heimbach GmbH & Co. KG, Düren). Field tests with the antenna and a standard GPS-mouse have shown that the textile-integrated GPS receiver shows a similar performance as conventional GPS receivers.



Meike Reiffenrath is a PhD student at Institut fuer Textiltechnik of RWTH Aachen University, Germany.
Kolja Vornholt Currently is working towards his M.Sc. degree within a collaboration of the Institute of High Frequency Technology and the Institut fuer Textiltechnik, RWTH Aachen University.

Folded Light –
Interactive Smart Textile Modules created by the design parameters of Paper, Folding and Light

Theresa Scholl

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Folded Light are five different smart textile modules for the interior design. The core design of these modules is based on the aesthetics of folding and light. The origin of all objects is the V-folding. Each module is created and characterized by a variation of this folding. The roots of this specific folding can be found in Origami. Since Origami is usually practiced with paper, paper is the core material for the Smart Textiles. The textiles are woven as drebfabrics out of paper yarn combined with other textile yarns. The second component, light, is included in the modules in form of white LEDs. By integrating a microphone-sensor and a microprocessor (Lilypad Arduinio) into the textiles, the Smart Textile modules are able to interact with their environment in an intelligent way. Through an autonomously created programming, a certain amount of LEDs are activated and send out different intensities of light depending on the volume of noise of the environment. In this way, the Smart Textile is able to interact with people around it by responding with different intensities of light to the noise the people make. By these intelligent and catching reactions to their environment, the Smart Textile Modules can unfold their own presence in a room.

Theresa Scholl just graduated from University of Applied Sciences Hochschule Niederrhein as a Design-Engineer for Textiles. During her studies she first learned about the possibility of combining modern technology with traditional textile production". She focused on Smart Textiles in her final BA thesis: "The developing of interactive Smart Textile Modules with the design parameters of paper, folding, light."

On-cloth wearable e-nose for detecting the body odour signature of wearer

Thara Seesaard, Chayanin Khunarak, Rotthaporn Palasuek, Satetha Siyang, Tanthip Eamsa-ard, Panida Lorwongtragool and Teerakiat Kerdcharoen

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We have developed a wearable electronic nose (e-nose) embedded on cloth for detecting the body odour of wearer, aiming to be a self-monitoring healthcare consumer electronics. This "smelling shirt" consists of eight chemical gas sensors based on functionalized single-walled carbon nanotubes (f-SWNTs) and polymer composites fabricated by embroidering and drop coating process. Sewable electronic modules based on LilyPad Arduino together with wireless ZigBee module were used for data acquisition and communication. The performance of the sensors has been tested with a selected set of volatile organic compounds as usually presented in the body odour, such as ammonia, dodecane, 2-ethylhexanol, butyric acid, 6-Methyl-5-heptenone, nonanal and water. A smelling shirt system for personal health monitoring was designed to be suitable for the measurement of human body odour, especially under the armpit area which contains a large number of glands where bacterial activities will result in a stronger smell. Discrimination of individual health status and analysis of the odour-print (or smell-print) of specific persons were confirmed by principal component analysis (PCA), which was found to be able to track change in the human body odor, thereby showing its potential to be applied for real-time point-of-care health monitoring.

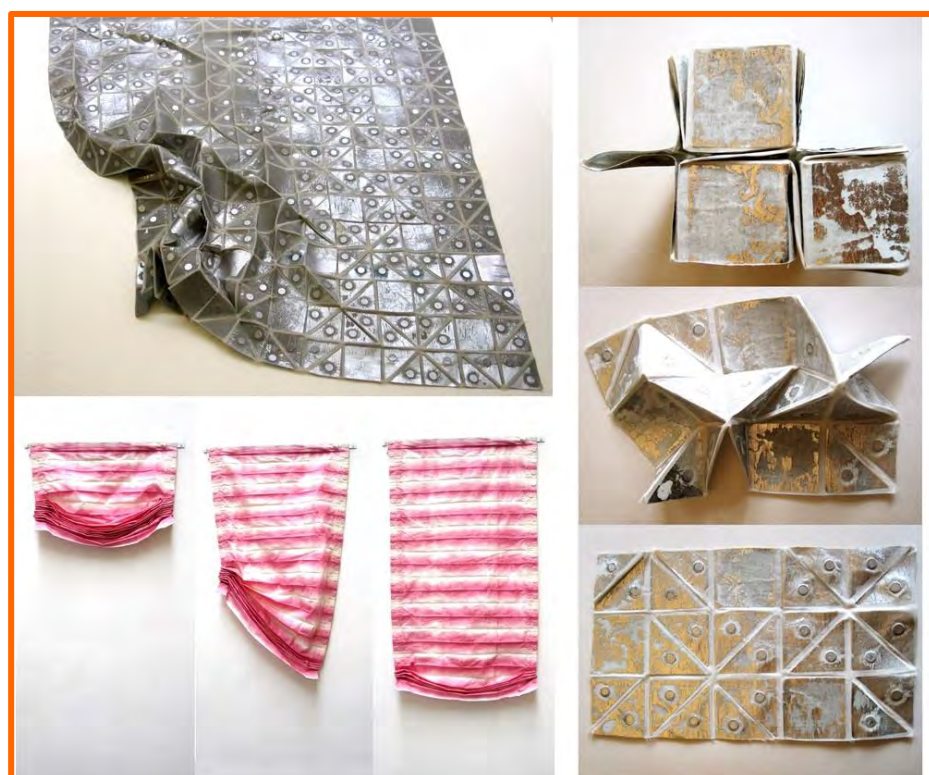
Thara Seesaard, Ph.D. student, Doctor of Philosophy Programme in Materials Science and Engineering (International Programme), Faculty of Science, Mahidol University, Bangkok 10400, Thailand

Teerakiat Kerdcharoen, Assistant Professor in Physics, Materials Science & Engineering, Department of Physics, Faculty of science, Mahidol University, Bangkok 10400, Thailand. Research staff at NANOTEC Center of Excellence at Mahidol University, National Nanotechnology Center, Thailand

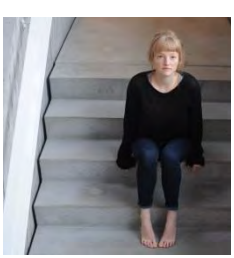
Magnetic blind

Kivy Theunen

kivyth@gmail.com



Fascinated by dance and the art of combining movement, I researched how to represent this language through textile, the ways to translate its flexibility and spontaneity, how to put the motionless in motion. The dancer plays with space. His movements evolve from one point to the other in a succession of gestures which transform the space. This led me to look for a structure which could expand and evolve in the same way as a movement does. The integration of various elements into the textile including magnets enable me to develop an object that has a shape which can be transformed. My investigations led me to conceive blind systems in which magnets are integrated in a way that allow for opening, raising or attaching the blind in various ways. This creates a completely modular and adaptable blind according to the fantasy and needs of the user. Furthermore, the presence of magnets in the textile generally allows for the blind to be directly applied to the wall without any other attaching system, thanks to metallic elements often found in the structure of most walls and window frames.

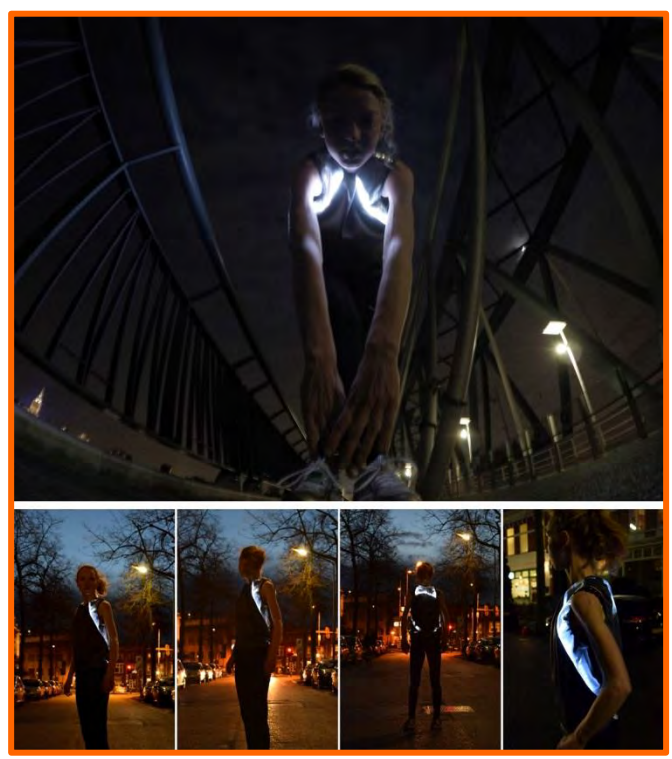


Kivy Theunen is particularly interested in multifaceted projects on the border of textile, object and scenography.
From her practice of contemporary dance, yoga or circus, she kept fascination for the energy of the body in space, the body in movement or in balance, which can be found back in her work
Volume, 3 D and news technologies: Movement led her to approach space and volume in her textile research. The effect of light and time are recurrent sources of her inspiration. She is particularly interested in conceiving curtains and lamps which are always light, fluid and surprising.

Illuminated Running Shirt

PAULINE VAN DONGEN Pauline van Dongen

contact@paulinevandongen.nl



Pauline van Dongen has developed a light-emitting shirt, which is meant to increase runner's visibility in a nighttime urban environment. The streamlined shirt is made of a soft sportswear fabric combined with area's made of a film with prismatic qualities that refract the light of the concealed led ribbons in a very exciting new way. Currently a small series of 5 prototypes has been developed, which have been launched during the Nike Womens Run in Amsterdam on May 16th. Later this year the development is scheduled to continue by creating a new iteration of the design based on feedback given by wearers. Next to this the shirt will be enhanced with dynamic light behavior that will be tested within a social context, namely a running group of 10 people.
The shirt has been developed with the support of Philips Research, one of the partners within the Dutch research programme 'Crafting Wearables' in which Pauline helds on of the two PhD positions.

Pauline van Dongen researches the body in a technologically textured space.
After graduating from ArtEZ, Academy of the Arts in Arnhem, the Netherlands, she started her own women wear label in 2010.
She operates a meticulous research of the behavior of experimental and high-tech materials, combining new technologies with traditional techniques to constantly renovate craftsmanship.
Working closely with companies from the field of science and innovation, she aims to merge fashion and technology giving life to scientific creations.
Pauline is involved in a Ph.D program, Crafting Wearables 2013-2017, in collaboration with the TU/e University in Eindhoven.
www.paulinevandongen.nl

Solar Shirt

PAULINE VAN DONGEN Pauline van Dongen and Holst Centre

Holst Centre
Open innovation by IMEC and TNO

contact@paulinevandongen.nl

The Solar Shirt is the latest design in our Wearable Solar collection and has been developed in collaboration with Holst Centre. The shirt seamlessly incorporates 120 thin film solar cells that are combined into standardized functional modules using Holst Centre's stretchable interconnect technology for integrating electronics into fabrics. It combines solar panels and flexible electronics into an attractive, off-the-peg T-shirt for everyday wear that can charge a smartphone or any other USB compatible, portable device. The night blue shirt is made out of a double-knit with a subtle texture and shine. It has been ingeniously constructed out of one piece of fabric, resulting in a softly rounded loose fit shape, while at the same time allowing the solar modules to be laminated before constructing the garment. The design of the solar modules has been approached from an aesthetic perspective, making the circuitry an elegant and striking feature of the design. With this attractive yet practical garment that people could wear every day we're taking solar fashion from the catwalk to the high street.

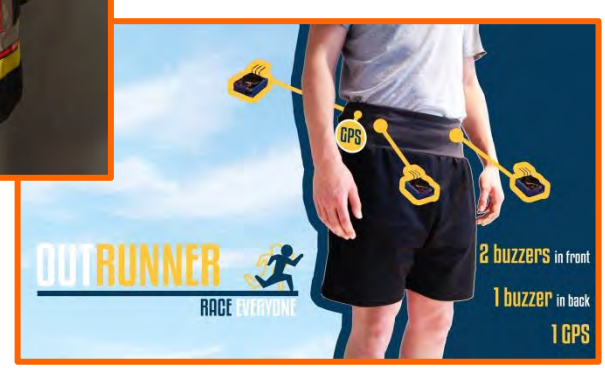
Pauline van Dongen researches the body in a technologically textured space.
After graduating from ArtEZ, Academy of the Arts in Arnhem, the Netherlands, she started her own womenswear label in 2010.
The integration of different expertise has been fundamental for the realization of projects such as Wearable Solar, an example of wearable technology that integrates solar cells into garments, and Mesopic, a light-emitting jacket created in collaboration with Philips.
Pauline is now involved in a Ph.D program, Crafting Wearables 2013-2017, in collaboration with the TU/e University in Eindhoven.
www.paulinevandongen.nl

Firelight
Outrunner

Foubert Francis, Maarten Vanhoucke, Jelle Saldien

Thomas Gruwez, Maarten Vanhoucke, Jelle Saldien

m.vanhoucke@ugent.be



FIRELIGHT is an outfit that helps keep firefighters safe."
Firefighters are often in dangerous environments. And sometimes there are accidents. The outfit the firefighters have now is complete fire and heat resistant but that also has a downside. The man inside the gear doesn't feel the heat outside and isn't aware if it gets too hot. Another problem that occurs is that the firefighters aren't visible enough. This leads to confusion and sometimes accidents.

With this outfit both those problems are solved. The firefighter is warned by tactile feedback. This feedback is regulated by a heat sensor. And because of the lights he is more visible than ever. The prototype integrates EL-lighting with regular firefighters' outfit.

OUTRUNNER, designed for recreational runners, creates competition everywhere you want. Because competition can make everything fun. You can race yourself or your friends by loading your or their previous runs into the system. You run the same course and by giving little vibrations in the front or in the back, OUTRUNNER can let you know whether your opponent is either (virtually) chasing or outrunning you. In this way, virtual races are created between you, yourself, your friends, everyone, … motivating each other to keep on running.

Maarten Vanhoucke received his B.S.degree in Mechanical Design at Katho University College in 2009 and his M.S.degree in Industrial Design at Howest University College in 2012. He works part-time for Ghent University and is manager of Vanhoucke Machine Engineering. Both jobs focus heavily on research and development.
Maarten's field of research is situated in industrial design engineering, with focus on mechatronics design and rapid prototyping techniques.

Hybrid Integration Technology for Electronics in Textile Applications

Bjorn Van Keymeulen, Frederick Bossuyt, Johan De Baets, and Jan Vanfleteren

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A hybrid technology to integrate electronics into textile materials is presented. Based on strechable electronics, it bridges the gap between conventional rigid electronic components and flexible textile materials. Due to its textile friendly processing, the technology is compatible with almost every kind of textile material. The technology consists of two parts: the strechable interposer technology and a textile substrate with electrically conductive yarns, which are combined by an interconnection. The strechable interposer technology (consisting of microcontrollers, strechable interconnections, textile vias and an encapsulation) allows electronic circuitry to adapt the physical properties of textile materials (drapable, usable in humid environments, etc.). The textile substrate with conductive yarns acts as an electrically conductive wiring system and can also be implemented as sensor and/or actuator. The conductive yarns are applied by means of a conventional textile fabrication process, e.g. weaving, embroidery or sewing. By an interconnection method the passive (but electrically conductive) textile part and the active (but physically compatible with textile) electronic part are brought toghether into one hybrid smart textile application. The obtained application has many advantages over state-of-the-art integration technologies. Also a cost effective way to produce large area electronics is made possible.

Bjorn Van Keymeulen received M.Sc. degrees in Electronics-ICT from College University Ghent and in Electrical Engineering from University Ghent, in 2010 and 2012 respectively in Belgium. In 2012 he joined research group CMST, University Ghent, as Doctoral Researcher. He is currently holder of three patent applications in the field of smart textiles and winner of the Techtextil Student Competition 2015 in the category Material Innovation. His current research interests include stretchable electronics and integration of electronics into textiles.

Smart Carpet

Bjorn Van Keymeulen, Pedro Claeren, Guy Van den Storme, Dominique Andries, Frederick Bossuyt, Ward Verlinde, Manuel Van den Storme, Tom Verhaeghe, Johan De Baets, and Jan Vanfleteren

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A lot of smart textile technologies and applications were introduced over the last years. However, only a limited amount of them are adopted by the industry due to their low degree of manufacturability. With this project we aim to bridge the gap between a smart textile technology developed at a research institute (Centre for Microsystems Technology) and the Flemish textile industry. The goal is to obtain a manufacturing process and logistics flow in which large area smart textiles can be produced by means of a roll-to-roll process. The processes have to be as close as possible to their conventional counterpart. This to obtain cost efficient as well as close-to-the-market products and applications. To demonstrate the capabilities of the developed knowledge a smart event carpet was developed. The term 'smart' in smart carpet is justified due to the added electronic functionalities. The first added funtionality is that the carpet can generate local light output by means of Light Emitting Diodes (LEDs). The second functionality is the ability to measure the presence of people, in this way the carpet is able to measure if somebody is walking over the carpet or touching it. The carpet has a fixed manufacturing height, but this can be changed upon the application. In the case of the produced prototype the height is 1,5m. Also the length of the smart carpet is not limited by any parameter, the active length of the prototype is 11m.

Bjorn Van Keymeulen received M.Sc. degrees in Electronics-ICT from College University Ghent and in Electrical Engineering from University Ghent, in 2010 and 2012 respectively in Belgium. In 2012 he joined research group CMST, University Ghent, as Doctoral Researcher. He is currently holder of three patent applications in the field of smart textiles and winner of the TechTextil Student Competition 2015 in the category Material Innovation. His current research interests include stretchable electronics and integration of electronics into textiles.

Disastrous Dinner

Wendy Van Wynsberghe, Claire Williams

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Dinner parties are prone to protocol. What fork goes where, which glass is for wine and which one is for water? What is the order of things? What should you not do during a meal? What disaster can happen whilst eating?
This interactive sound installation allows you to come and play with slight breaches of etiquette, and discover their inner rhythm.

Knit, Claire Williams, sound and electronics, Wendy Van Wynsberghe
Made with Open Hardware and Free Software

Wendy Van Wynsberghe and TIO3
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.

Colour-changing Smart Home Textiles via Innovative Jacquard Weaving

Miss Wing Yan Gloria WU, Dr. Joe AU, Dr. Chu Po HO and Dr. Jin LAM

tcjoeau@polyu.edu.hk, tccpho@polyu.edu.hk, cjinlam@polyu.edu.hk and bobobabc@hotmail.com

Prototype A: Smart Sofa Cloth
It illuminates in daytime and nighttime. The specific pressure sensor will be integrated with the woven fabric and the pre-selected music will be automatically turned on when people sit on it. When it senses a pressure greater than 30lbs, it will send a specific signal to the amplifier which will be activated and the music will start to play.It changes colour when exposed to the light and can absorb and store light/heat energy, then glow in the dark. It can be recharged and glow unlimitedly. This fabric become intensely coloured after 15 seconds in direct sunshine or light and return to clear after about 5 minutes indoors.

Prototype B: Smart Lamp Cover The woven fabric is applied with photochromic dye by using screen printing method. It is designed to save the energy power at home and create a ready-to-bed condition to let people turn it off an hour earlier before going to bed. When the light is switched on, the photochromic dye on the Smart Lamp Cover absorbs energy and it will illuminate and show the printed pattern on the woven fabric.

Prototype C: Smart Glass mat
It does not require any electricity supply as the thermal material can provide colour-changing effect itself.When a glass of iced water is put on the Smart Glass Mat, it sensed the relative humidity greater than 80%; the fabric changes from clear to red colour because of its thermal properties.

Gloria Wu is currently a final year PHD student studying in the Institute of Textiles and Clothing, The Hong Kong Polytechnic University.
Other authors are**: Dr. Joe**, **Dr. Chu Po Ho,** and **Dr. Jin**

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

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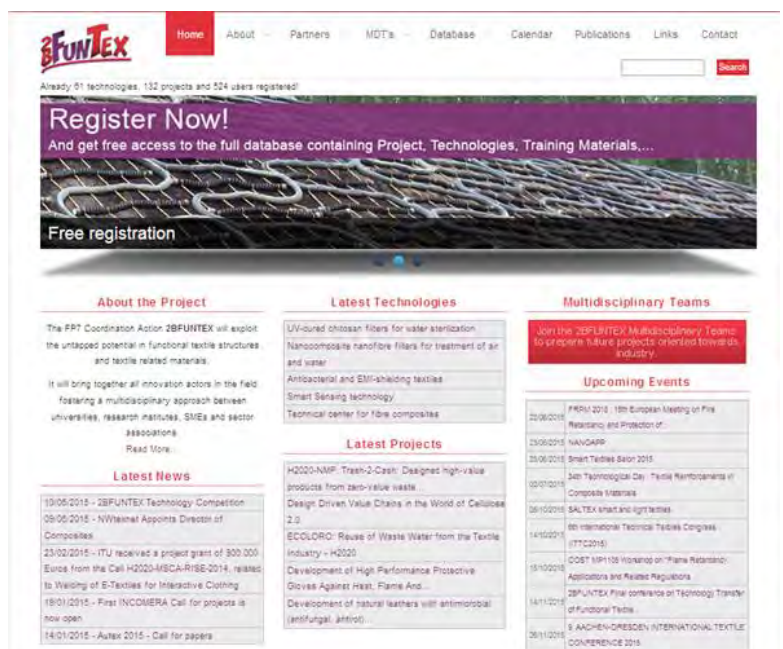

Join the 2BFUNTEX Technology Contest

In 2015, the 2BFUNTEX consortium organizes a free **technology competition**. If you have a new technology in the field of functional textiles that you wish to transfer to industry, you are invited to **upload your technology on the 2BFUNTEX Open Innovation Platform** www.2BFUNTEX.eu before **30 September 2015**.
The two most promising technologies will be selected, and the winners will be given the **opportunity to give a presentation at the 2BFUNTEX Final Conference on Saturday 14 November 2015 at ITMA 2015** and receive a contribution to cover their travel expenses up to max. € 500.
The selection committee will assess technologies against three criteria: the innovation assessment of the new technology, the time to market the innovation, the potential impact of the technology on the textile sector.

2BFUNTEX Final conference on Technology Transfer of Functional Textile Innovations

Saturday 14 November 2015 at ITMA 2015, Milan, Italy

Successful cases of effective technology transfer on functional textiles between research & industry will be presented with special focus on Antimicrobial textiles, Smart Textiles, Nanotechnologies, Flame retardancy, Biotechnology, Electrospinning, Plasma, Sustainable textiles and Other functional textiles.

More info on www.2bfuntex.eu and www.itma.com/conferences/2bfuntex

The **European Coordination Action 2BFUNTEX** brings 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. Within **2BFUNTEX the Open Innovation Platform** (OIP) has been created which is the place for both companies to detect new technologies and business opportunities as well as to express their needs, and for research institutions to present their current and future actions in research and education, and their available technologies. Based on the analysis of the technology-innovation gaps, **8 multidisciplinary teams** (MDTs) that collaborate along the following specific research topics were identified and set up : antimicrobial textiles, smart textiles, nanotechnologies, flame retardancy, biotechnologies, electrospinning, plasma and sustainable textiles. Each MDT is led by a research and an industrial team leader and will identify some tangible gaps between available technologies and medium to long-term industrial needs. All MDTs are also open to researchers and industrial persons from outside the 2BFUNTEX consortium.


systeX

SYSTEX Student Award 2015

And the winner is....

Sponsored by

Royal College of Art
Postgraduate Art and Design

Peacock

Myrto Karanika

myrto.karanika@network.rca.ac.ukl

Peacock is a responsive rug that is 1.60 x 2.40m in size. Its design involves a 3D conductive grid that is embedded in its underlay. The grid is connected to a sound engine through a complex of shift registers which are in turn connected to an Arduino. This technology allows the rug to act as a soft, tactile, numerical interface that has the ability to track people's movement on it, and to sonically respond to it by generating an organic soundscape that evolves over time with respect to people's unique interactions. People are invited to remove their shoes and spend time on the rug (playing, walking, crawling or simply laying down and relaxing), and to explore the relation between their performed activities and the generated soundscape.

Materials: spacer fabric, conductive mesh band, felt, various electronic components, various threads, Arduino microcontroller

Software: Arduino, SuperCollider

Peacock was developed as part of my practice-based PhD on perception that is conducted in the Textiles Department of the Royal College of Art.

Myrto Karanika is an architect and an artist. She holds an AHRC funded MFA in Computational Studio Arts from Goldsmiths University of London, and is currently a PhD candidate at the Royal College of Art.
Myrto's artistic practice touches upon a variety of fields such as spatial design, responsive art, textile art, sound art and biology. Combining the use of soft technologies with traditional art practices like illustration, printmaking, stitching and embroidery, she creates textile-based responsive installation pieces that seek to unravel aspects of perceptual activity and bodily engagement mainly within the context of spatial experience. Her work has been presented and exhibited in a variety of different public contexts across the UK as well as in Greece, Italy, Brazil and Romania.

Nominated for the SYSTEX Student Award 2015

EJTech (Esteban de la Torre, Judit Eszter Kárpáti)
Moholy-Nagy University of Art and Design, Media Institute.
"Sensory line"
http://ejtech.cc/

Myrto Karanika
Royal College of Art, UK
"An art-based study on perception through the employment of a touch-sensitive, sound generating rug"
myrto.karanika@network.rca.ac.ukl

Theresa Kretsch
Berlin WeißenseeSchool of Art (Berlin)
"Stretch Knit"
theresa_kretsch@web.de

Mingjing Lin
Royal College of Art
"3D texture innovation utilizing traditional techniques and modern technologies".
Mingjing.lin@network.rca.ac.uk

Isabel Pfab
The University of Twente (NL)
"smart garments and their opportunities for impact on society."
x.pfab@student.utwente.nl

Daniela Kovacevic (LENA DKM)
The College of Textile – Design, Technology and Management – DTM, Belgrade
"Women's collection inspired by wearable technology"
Lenathemil@gmail.com

Bjorn Van Keymeulen and Bart Plovie
Centre for Microsystems Technology – University of Ghent and imec
"Smart carpet"
bjorn.vankeymeulen@ugent.be

Kolja Vornholt
Institut für Textiltechnik Aachen of RWTH University and Institute of High Frequency Technology of RWTH Aachen, Germany
"Textile-integrated receiver for global positioning system (GPS) signals"
kolja.vornholt@rwth-aachen.de