Textile & Surface Design

DESIGN AND EXPERIMENTAL MATERIAL RESEARCH

CONTENT

DESIGN AND EXPERIMENTAL MATERIAL RESEARCH

The design of a product or a space is significantly connected to its materiality. Within this context, the surface with its sensory characteristics plays a central role, as do aspects such as function, quality, sustainability or integrated technology. Experimental material research embodies a substantial tie between knowledge of materials and competence in realising material-related tasks, as well as the ability to comprehensively analyse the technical and design implications of materials, use their potential creatively and expand their scope in innovative ways. In today's technological and sociocultural context, materials find themselves in a complex web of interrelationships, which enables new technical and contentual connections and combinations. A creative engagement with them, unlimited by particular material categories, opens up connections to many different fields of application, from which new areas of action and competencies for design can be developed.

Topics dealt with in the field of experimental material research are for example »Soft Technologies«, »Textile Techtonics«, »Interactive Interfaces«, »Biomimetic Design«, »Future Crafts«, »Sustainable Design«, »Sensory Design«, »E-Textiles and Physical Computing«, or »Functional Surfaces in a Spacial Context«.

With both research areas, 'Functional Surfaces in an Architectural Context', and 'Sensory Soft Interfaces' within the contexts of Body-Object-Space, the department of Textile and Surface Design sets itself the objective of firmly rooting the experimental materials research in design, long-term and sustainably, at Weissensee Academy of Art Berlin.

Through interdisciplinary cooperations with various technology, cultural and economic partners, a realistic implementation of visionary, ambitious design concepts is enabled.

AREAS OF RESEARCH

SENSORY SOFT INTERFACES WITHIN THE CONTEXTS OF BODY, OBJECT, SPACE

The overall aim within this area of research is to initiate experimental and test promising future-oriented design approaches, in order to design active or interactive surface systems and tangible interfaces for the body, as well as its various environments.
In the field of soft technologies, which includes flexible electronics and electronic textiles, digital and analogue become one. The immaterial code and the mechatronics, in conjunction with the creative investigation of material properties, are used as mediums in order to create interfaces for meaningful interactions, whether information-related, functional, playful or poetic. Thus flexible membrane systems become vehicles for digital and mechanical networks.

Some of the questions that are asked along the way are:

- How to equip surfaces with interfaces that react to their environment?
- Which new ›interfaces‹ can people, objects or spaces have, and which interactive scenarios would be conceivable and reasonable?
- How to integrate useful information into people's lives in fluid and intuitive ways?
- Which design approaches can be defined, in order to integrate functional textiles and soft interactive technologies into everyday life using their full potential?
- What role does the materiality and senso-aesthetics play within this context?

RESEARCH LEADER:
PROF. DR. ZANE BERZINA

Prof. Dr. Zane Berzina, trained as a professional textile designer, works on various projects at the cross-section of design, art, craft, science and technology. Her design practice and research focuses on intelligent surface systems and soft technologies, new materials, processes and scenarios for interactive design, as well as biomimetic practices. She obtained her Ph.D. in 2005 at the University of the Arts in London with a practice-led thesis, »Skin Stories: Charting and Mapping the Skin«.
Her practice and research contributes to interdisciplinary activities in science, art and design, and thus shows how these influence the cultural and technological context. She is the author of numerous publications and has given academic lectures at international conferences, as well as showing her work in multiple solo exhibitions and renowned international exhibitions.
She has, amongst other posts, been a lecturer at the University of Arts Berlin, Institute for Experimental Fashion and Textile Design (2000 – 2004) and at Goldsmiths, Visual Arts Department, University of London (2004 – 2006), as well as Arts and Humanities Research Council funded Design Researcher at the Constance Howard Resource and Research Centre in Textiles, London (2006 – 2009).
Since 2008 she has been a professor at Weissensee Academy of Art Berlin in the department of Textile and Surface Design with her area of focus on conceptual design of materials and surfaces, and an associated member of the Goldsmiths Digital Studios, University of London. As a co-founder of eLab (Laboratory for Interactive Technologies) and GreenLAB (Laboratory for Sustainable Design Strategies) she is particularly interested in the possibilities and synergies of ecological high-tech developments. Since 2014 she is a main investigator on several R&D projects within the framework of „smart3 - materials, solutions, growth“ - a research consortium funded by the German Federal Ministry of Education and Research (BMBF) - for the development of new, innovative products on the basis of smart materials. Berzina is a member of the editorial board for several peer reviewed academic publications: »The Nordic Textile Journal« published by The Center for Textile Research, University of Borås, and also »Journal of Textile Design Research and Practice«, Bloomsbury Publishing. Amongst other publications she is a co-editor of »The Digital Turn: Design in the Era of Interactive Technologies« and sits on the advisory board for The German Federal Ecodesign Award.

FUNCTIONAL SURFACES IN ARCHITECTURAL CONTEXT

The aim of this research area is to develop surfaces for the spatial context, which unite function with design. Functional energetic or structural material properties and effects are not invisible components, but become definitive elements of the design approach.
Textile surfaces in particular, due to their structure and material construction, offer the possibility of combining functionality with minimal weight and adaptivity. The focus is placed on new material technologies (e.g. smart materials), and on upscaling textile constructions into an architectural context.
As an interface between interior and exterior, the skin of a building is subject to particular conditions and must provide climate and comfort. The facade as an addition of functional layers renders possibilities for active surfaces, which could serve the purposes of climate control or energy gain. Also interior surfaces allow for the integration of functional elements and thus develop new design concepts for space, lighting, acoustics, climatisation or monitoring.
Materials research and development, resource and energy efficiency through active surfaces are further fields of research.

RESEARCH LEADER:
PROF. DIPL-ING. CHRISTIANE SAUER

Prof. Dipl.-Ing. Christiane Sauer is an architect and materials specialist. Her focus is on innovative applications of material, product development and architectural planning with emphasis on materials. She is the founder of Formade – Office for Architecture and Material – as well as partner in the architecture firm Lüling Sauer in Berlin. As a freelance architect she has worked for international firms such as OMA/Rem Koolhaas Rotterdam, David Chipperfield Berlin, or FACE Design NYC. Christiane Sauer is a member of the Berlin Chamber of Architects and the Association of German Architects (BDA). From 2001-2008 she occupied a research associate post in the department of Architecture at the University of Arts Berlin, engaged in both teaching and research on the topics of building construction and design. In 2010/11 she held the endowed Hans & Roger Strauch professorship for »Material Sustainability« at Cornell University, Ithaca NY. In 2012 she was guest professor in the Industrial Design department at Burg Giebichenstein University of Art and Design in Halle. Since 2013, Christiane Sauer is a tenure professor at Weissensee Academy of Art Berlin, with a focus on material and design in an applied spatial context. As a visiting lecturer and guest critic she is internationally involved amongst others at SCI-Arc Los Angeles, Northeastern University Boston and Pratt Institute New York.
She regularly contributes to specialist journals and publications on the topic of materials, e.g. as author of the series 'Space and Material' in »md magazine« and is co-founder of the design platform »Architonic«. Her material compendium »Made Of... New Materials for Architecture and Design« was published in 2010 by gestalten, Berlin. Since 2012 she is moderating the research symposium series »The Future of Building«, hosted by DETAIL research and the federal ministry for building.

THREE-DIMENSIONAL WEAVES
URSULA WAGNER
2013

The work Shaping Weaves - Weaving Shapes focuses on the plasticity of weaving and investigates the design of three-dimensional textile structures, which shape themselves through their construction: shaping weaves - weaving shapes makes the crossover between 2D and 3D tangible through a series of woven objects.
The starting point is thus a way of observing, in which the weave is not seen as an image or a flat patterned fabric, but instead is perceived as a spatial object. For the realisation of this aim, it is necessary to create the impression of spatial depth by weaving several layers on top of one another. The construction of these specific weave patterns and the use of active yarns, such as banana fibre, copper wire and highly twisted crepe wool yarn, effect synergies, which cause a spatial object to appear from the surface. Central to the project is the experimental investigation of the interface between material, technology and aesthetic.

In cooperation with the Textile Lab of Audax Textielmuseum Tilburg, NL.

SHAPING WEAVES
WEAVING SHAPES

Three dimensional weave. Foto: Juliane Eirich

Facade panel with functional and colorful surface-change

CHAMELEON - MEMBRANE
MADLEN DENIZ
2013

Chameleon Membrane is an active architectural façade element, which was developed based on the skin of a chameleon. Through a change in colour, intense sunshine is reflected and the overheating of an interior space can be avoided.

The membrane works independently of electricity, making use instead of thermal shape-memory alloys in its integral parts. These shape memory actuators are activated through heat energy, and make it possible to silently carry out a set motion for up to ca. 100,000 cycles. The Chameleon Membrane is conceived for large-scale glazing and can be easily installed at a later date.

According to the principle »form follows environment«, the Chameleon Membrane adapts to the current weather conditions and acts as a natural buffer mechanism between the needs of humans and their given environment.

In cooperation with Fraunhofer IWU.

CHAMELEON MEMBRANE

SCREENSTOFFE - EDITED / AUTOSAVED
VERONIKA AUMANN
2013

SCREENSTOFFE EDITED/AUTOSAVED

Starting from the notion of a material, which behaves and feels like a textile, yet simultaneously functions as a screen, this project formed an investigation into the so-called Screenstoffe. This 'screen-fabric' is defined as the actual fusion of a high-resolution screen and a high-quality dress fabric, without losing the qualities of either component. The technological, creative and theoretical research into the Screenstoffe is visualised through the chosen garment: a coat. A collection of conceptual possibilities is presented in the form of 3D simulations, showing the characteristics and conditions of the future material. The Screenstoff #1, produced in cooperation with the Fraunhofer IZM, shows a material development which would be technically possible today. Together with the theoretical basis, this forms the foundation work for a research question that involves the fields of media theory and design: what if there were clothes made of fabrics which also function as screens?

In cooperation with Fraunhofer IZM.

Material development Screenstoff #1

A presently technically feasible realization of a textile screen.

Selection from the test series of textile motion-, pressure-, and stretch sensors.

R / KNITTED SENSORS
MARGARET WAIYEGO ZOLLINGER
2014

R investigates how electronic objects can be handled through the principle of stretch. When one part of the electronic circuit is constructed as a textile surface, a tactile experience of electronics is enabled. Knitting allows more than just the press of a finger – it can be stretched (or operated) by a whole hand, the elbow or the entire body. The material with its electronic component conveys information, communicating directly with the device according to the intensity of stretch. In a series of experiments, textile materials are converted into various sensors, so-called potentiometer, movement, pressure and stretch sensors. In later stages the research deepened – diverse conductive and non-conductive yarns were knitted using various techniques. This resulted in a broad archive, showing the correlation between mesh size, knitting technique, material and resistance.

In cooperation with eLab.

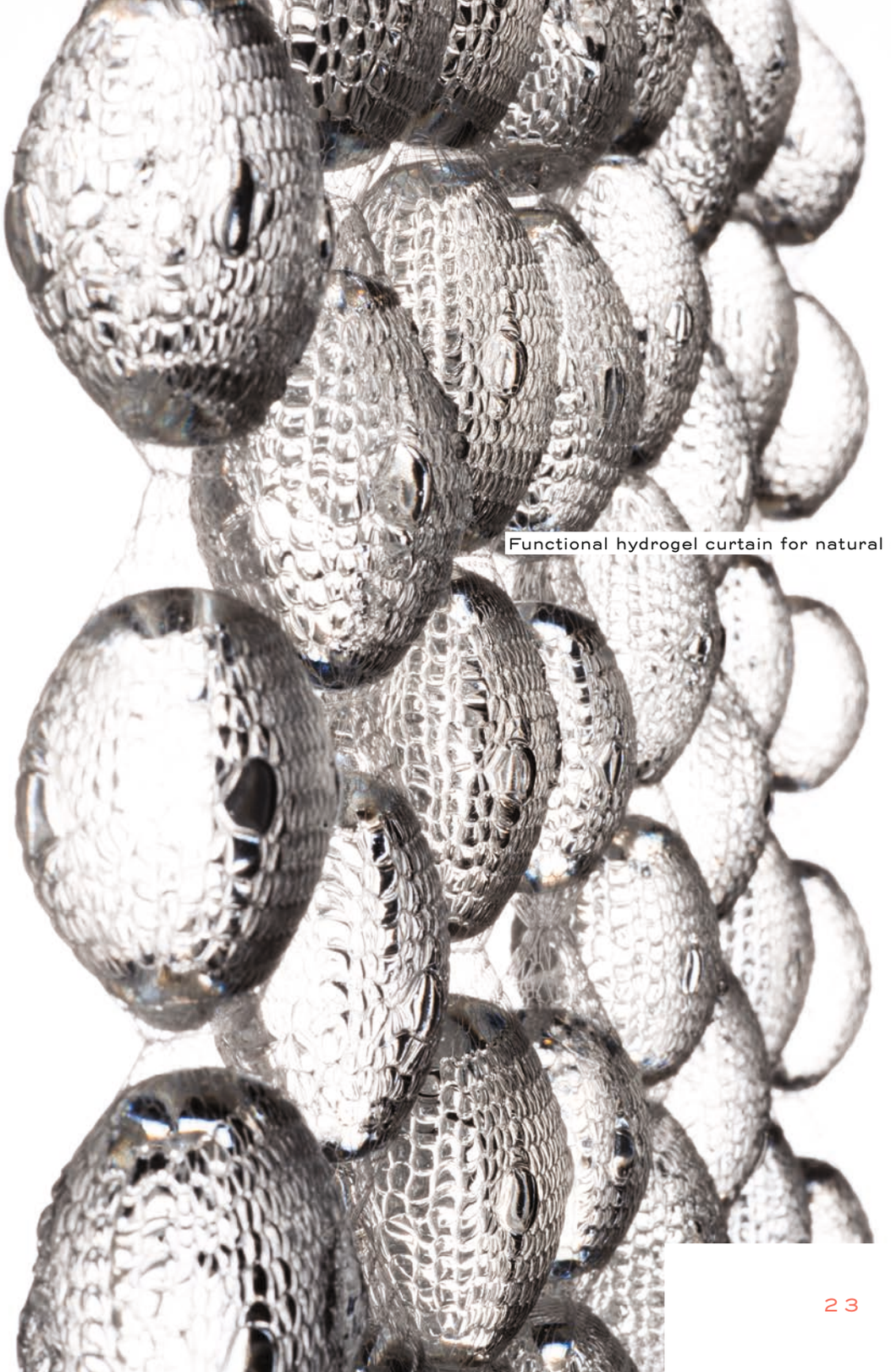
R KNITTED SENSORS

BI-DELTA
MARGARET WAIYEGO ZOLLINGER
2013

BI-DELTA investigates the field of living environments for ›Superabsorber‹ materials. The knitted textile incorporates super-absorber spheres in its structure, which when soaked in water, expand greatly in size to accommodate the liquid absorbed. The curtain can then be hung and will gradually humidify the room. The process can be repeated indefinitely according to the user's requirements. In this manner, one can enjoy a more pleasant, cool atmosphere in summer, and avoid dehydrated, dry atmospheres caused by constant heating in winter. The curtain becomes an air conditioning fabric that works without any external energy.

Through the infinite knitted pattern, the length of the curtain can be individually adapted. Besides its climate-regulating function, it is a visual spectacle: when dry, the delicate knit sways gently, as if floating. When the hydrogel is saturated with water, the weight gained through the fluid pulls the knitted structure straight downward.

In cooperation with the Saxon Textile Research Institute (STFI).



Functional hydrogel curtain for natural cooling.

Thermochromic coat with integrated Mini-LEDs, photochromic dress.

RAINBOW WARRIORS
ESTHER ZAHN
2013

rainbow warriors is a collection of clothing for children aged between five and fifteen, which playfully encourages them to discover the world. The garments in the collection possess hidden functions, which when carefully observed, can be seen, felt and heard. Through the combination of natural and ecological fabrics with high-tech materials, totally new textiles are created, which stimulate the senses and invite children to play and discover: Thermochrome and photochrome garments change colour in response to touch or under UV-rays, others glow in the dark, reflect light or even light up themselves through mini-LEDs woven into the fabric structure. A ›Sound Dress‹ reacts with six different sounds when touched in different ways by the wearer: the garment becomes a wearable musical instrument, where rhythm and melody can be combined independently.

In cooperation with Fraunhofer IZM, TITV Greiz & Fashion Department (Prof. Heike Selmer).

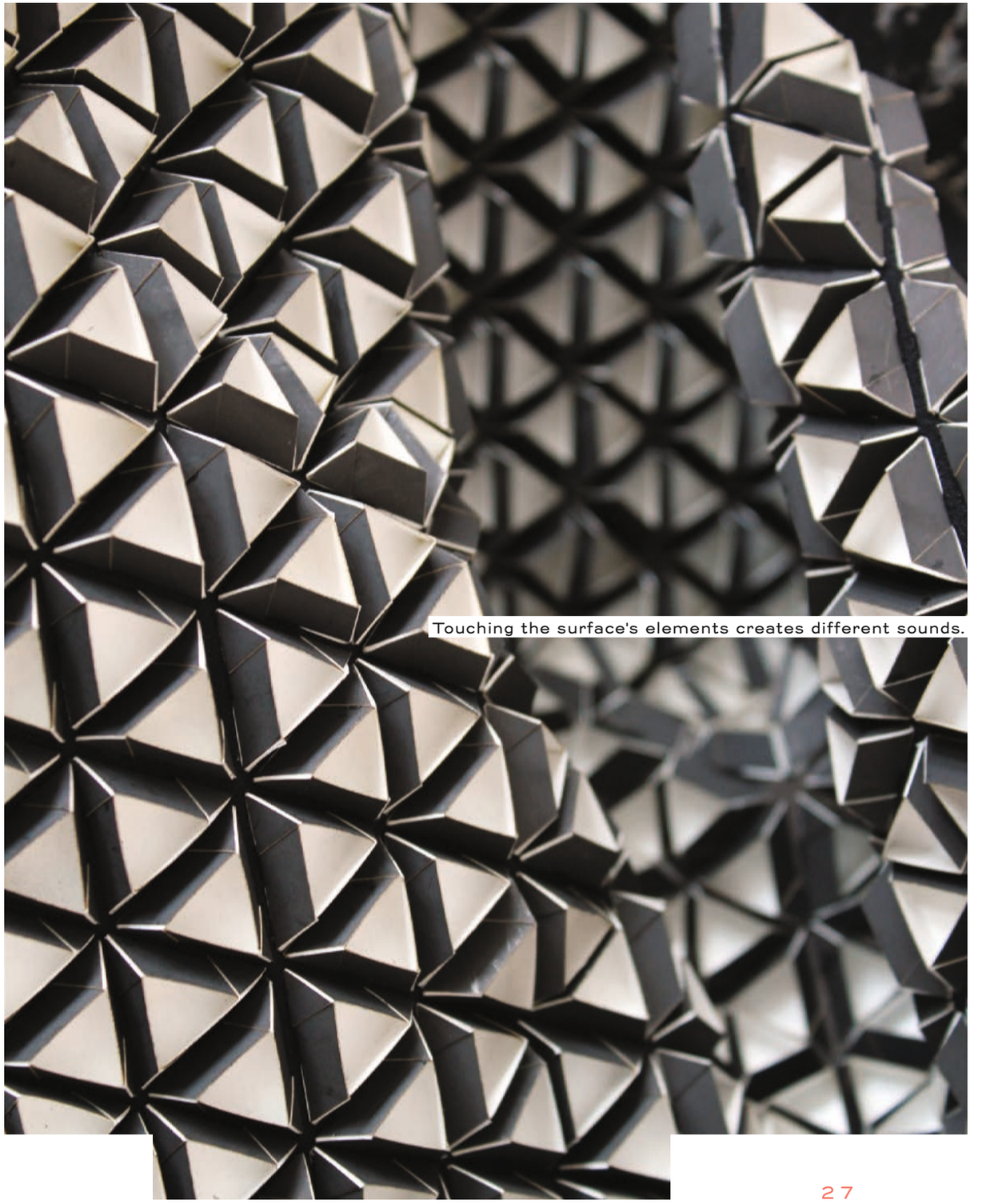
RAINBOW WARRIORS

SOUNDSCAPE
PAULA VON BRUMMELEN
2012

Soundscape is a performative flexible surface, which when touched, moved or distorted, creates synthetic sounds. The sounds are therefore dependent on the manner and level to which the surface is touched. The surface's acoustic effects can be explored by the user and played like an instrument. The individual geometric forms are coated on the outside with conductive material, and connected on the back by conductive yarn. Different electrical circuits close depending on which contact surfaces touch through the interaction with the textile. The yarn connections are attached to a micro-controller, which sends signals to a computer as soon as the circuit is closed. These inputs are then transformed into sounds.

In cooperation with Fraunhofer IZM.

SOUNDSCAPE



Touching the surface's elements creates different sounds.

An analogue textile printer produces pigments from microalgae.

ALGAEMY
CRAFTING OUR FUTURE FOOD
STUDIO BLOND & BIEBER
ESSI JOHANNA GLOMB & RASA WEBER
2014

Algaemy explores the creative potential of microalgae. Here the aesthetic qualities of an organic material are investigated, which is generally seen as a weed in Europe. Algaemy is an analogue textile-printer, which produces its own ink, that re-grows and replenishes itself astoundingly quickly. A notable colour palette can be extracted from the microalgae without using any chemicals. This colour palette is biodynamic and changes gradualy with time: the material tells its own story.

In this project, a creative design approach is united with an extensive research, scientific methods and experiments, through modern means of expression and rituals. Algaemy arose as an interdisciplinary cooperation, and blurs the boundaries between product design, textile design, biology and craft, translating a material from its scientific context into an aesthetic concept with a strong narrative.

In cooperation with Fraunhofer IGB.

ALGAEMY CRAFTING OUR FUTURE FOOD

FLORA SKIN
DOMINYKA SIDABRAITE
2016

Textiles create protective boundaries between the body and the surroundings, so that one can feel comfortable on a physical and an aesthetic level. Thus fabrics, with their functional, tactile and visual characteristics, are also often referred to as a ›second skin‹. The metaphor of protective skin was translated into a knitted textiles collection Flora Skin inspired by two biological systems found in Nature - tree bark and surfaces of leaves.

The tree bark was selected as a source of inspiration because of its distinct qualities - the protective function of bark is inherent to its surface structure. It is multi-layered, with the outer layer protecting the tree from the environment, solar radiation, cold, heat, and dehydration. The resulting knitted surfaces are produced using porous, elastic materials: special Pemotex and Recytex yarns mixed with sheep's wool, heckling combs, and steel wool to form elastic, multi-layered and bold knitted fabrics which are heat resistant, sound-absorbing, and flame retardant.

Rhododendron and viburnum leaves were considered for the second part of the collection. These have two contrasting sides; one is very smooth and water-impermeable, the other one is soft and hairy. Thus double-sided surfaces with respectively contrasting textures and properties, inspired by microscopic analysis of the leaves were created. The fine, delicate structures of the two-sided membranes obtained their functionality through the combination of natural fibers such as flax, linen, wool, silk. The knitted surfaces of Flora Skin, utilise their various functional properties, can be applied in both interior and fashion contexts.

In cooperation with Trevira, Siulas, Dunmore and Manufacture for Papermaking in Berlin.

FLORA SKIN

Plant-inspired knits that use a combination of man-made and natural fibres

Tangible textile codes can be experienced by hand, but deciphered by smartphone

UNDERCODING
ADRIANA CABRERA
2015

The Project Undercoding merges the digital multimedia content with tangible textiles. By materialising the QR code using embroidery and screen printing techniques highly tactile and aesthetic representations of digital data are achieved. The hidden messages in form of texts, poetry or songs can be accessed through use of a smart phone.
In this project, the textile is seen as a medium whose design serves as an encoded language of communication. The digital code becomes a graphic pattern, which emits an aesthetic message thus blending the borders between patterns and codes. The rectangular forms of a QR code are translated three-dimensionally into a textile relief through a cross-stitch pattern on woollen fabric. The binary information is printed on semitransparent panels of fabric, consisting of countless petrol blue dashes and squares. Undercoding reflects on the duality of reality and virtuality, whilst it extends the tangible textile surface through interaction with digital media. The fabric samples are equally suited to being touched and handled as a normal textile, or alternatively being viewed and digitally interacted with. When the surface pattern is scanned with a phone camera, the user is then connected with the corresponding website: http://undercoding.org.

In cooperation with Fraunhofer IZM & eLab

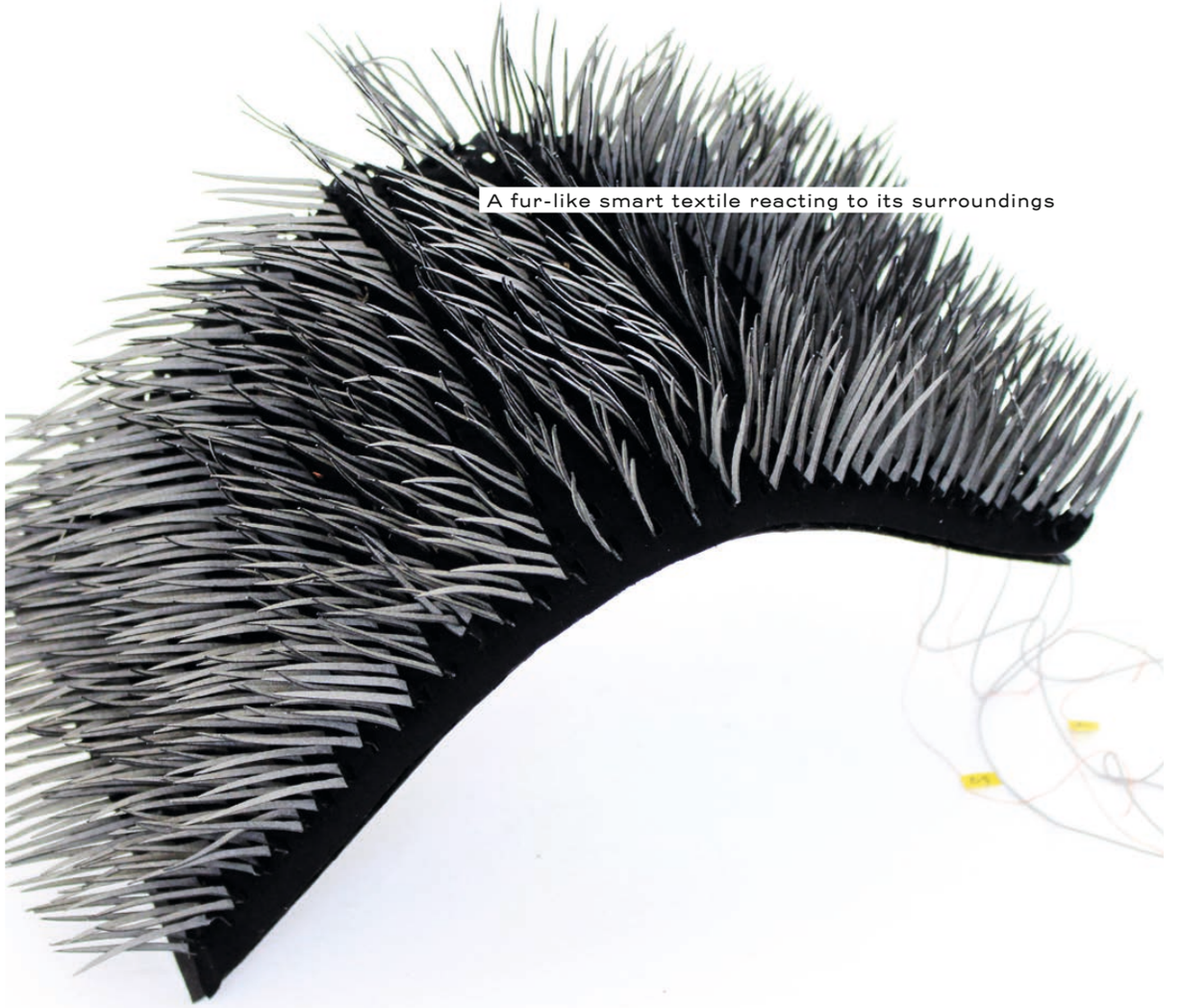
UNDERCODING

RESPONSIVE SURFACES
PAULA VAN BRUMMELEN
2015

Project Responsive Surfaces deals with the development of flexible surfaces, which are equipped with both sensory and reactive features. It follows the biomimetic design approach; the developed adaptable surface system with its kinetic properties is modelled on observations of natural hair and skin structures. Thus exciting interactive prototypes were created, that imitate animal fur both in its movement and appearance covered with countless sensitive ›hairs‹. Exactly like in the natural process of homeostasis, how the body regulates its temperature or how epidermis reacts to touch, these artificial hairs also react to changes in their environment. They can be stroked flat, or stand on end like goosebumps, dependent on outside stimuli.
Due to seamlessly integrated sensors, micro-controllers and the use of shape memory alloys as actuators, the surface structure undergoes the motions with fluid movements in the surface structure without losing the textile-like flexibility. The operating layer of the membrane, where all the technology is integrated, is condensed to less than one centimetre, not counting the additional 'hair'. For the production of this haptic interface minimum amount of materials is used in comparison with the existing interactive surfaces which still use an extensive 'muscle and bone' mechanism behind the surface to animate the visible ›skin‹ layer.
Through a custom scaling of the ›hair‹, modifications of their shape and choice of their material as well as through the integration of appropriate sensors, it is possible to adapt this system to fit various end applications such as thermal insulation and moisture regulation in our interiors or acoustic control in concert halls.

In cooperation with eLab.

RESPONSIVE SURFACES



A fur-like smart textile reacting to its surroundings

Varied compositions of natural Lusatian clay result in a broad colour palette

THE CLAY PROJECT
JENNIFER MAIER
2014

Lusatia (the German name Lausitz approximates to: boggy marsh) is a region in the East of Germany, which is best known as home to the Sorbs, a Western Slavic people, and for its coal resources. What is lesser known, is that there lies one of the largest tertiary clay deposits in Europe.

The Clay Project is an intuitively developed series of trials in ceramic, using the resources and local geology of the Lusatian region. The project arose under the presiding theme of »Postcarbon - Design for a sustainable Lusatia«, posed by the GreenLAB initiative of Weißensee Academy of Art Berlin: an annual laboratory for interdisciplinary, sustainable, ecological design. They set the aim of bringing sustainable design into this region, and thereby offering new prospects for the industry and future of Lusatia.

Maier set about systematically researching the material properties of different clays from the area, and simultaneously found that her trials reflect the colours and textures of the landscape. The visible result of the project is a colour palette of the region in ceramic materials. The firing process is the deciding step of the experiment, which reveals the true parameters of the material: how it reacts to heat, changing colour and consistency. From looking at the material samples, it is evident that mineral composition has a great influence on colour, plasticity, tension, structure and texture.

In cooperation with Stephan Schmidt Meissen GmbH and Regional Development Project Laurin and GreenLAB.

THE CLAY PROJECT

RESONANZRÄUME
DAFNA STOILKOVA
2015

The design project Resonanzräume (German: Resonance Spaces) investigates the relationship between material, structure, function and perception. Could something ›natural‹ be created with synthetic materials? Is it possible to produce a material, which behaves as if it is alive?

In order to focus her field of research, Stoilkova decided to examine how inelastic materials might transform into elastic materials. Lasercut played a significant role in her design work. The precision of the digital process led Stoilkova to design regular geometric patterns, which when cut into inelastic materials, can enable them to stretch and change shape.

The resulting work – a range of adaptive sculptural surfaces, formed from single sheets of various materials, is no conventional fabric collection for fashion, but rather a series of net structures of various densities, ranging from soft to hard, which encourage completely new ways of interaction between body and material.

The elastic behaviour of stiff materials enables movements, which synchronise on many levels with their context – optically, haptically and kinaesthetically. Produced in polypropylene, polyester and acrylic, the resulting collection of materials merge the terms ›artificial‹ and ›natural‹, as synthetic materials, when cut accordingly, take on an undeniably organic character. A basic principle of this unusual, knowingly contradictory, aesthetic is that the ›natural‹ is defined by precise prototyping.

In the context of the human body, the materials synchronise with its movements. It is possible that the geometry of the patterns, similar to optical illusions, passively interacts with the human psyche. In this manner, a beneficial resonance between body and material may arise, from which this resonance would determine a new sensory function.

RESONANZRÄUME

A laser-cut surface encases the body in a delicate, flexible framework

The felt modules interlock to create a continuous interior surface

MERGING LOOPS
BARA FINNSDOTTIR
2016

Merging Loops is based on a simple interlocking module system that was developed by Bara Finnsdottir as her final BA project. Fork-shaped pieces are cut from a recycling polyester felt and tucked into one another. The resulting loops form a three-dimensional structure that is stabilized by the stiffness of the bent material. This freestanding textile can be used as a spatial partition which is quickly set up and can be stored as a flat package when the modules are taken apart. The system can generate surfaces of any desired length and has good sound absorbing qualities based on its materiality and geometry.

A hanging variation of the design explores smaller modules made from felt and wood veneer. The hanging modules stay in place due to the friction of the differing materials and the tucked loops. Due to endless variations in the combinatory system different patterns can be created.

MERGING LOOPS

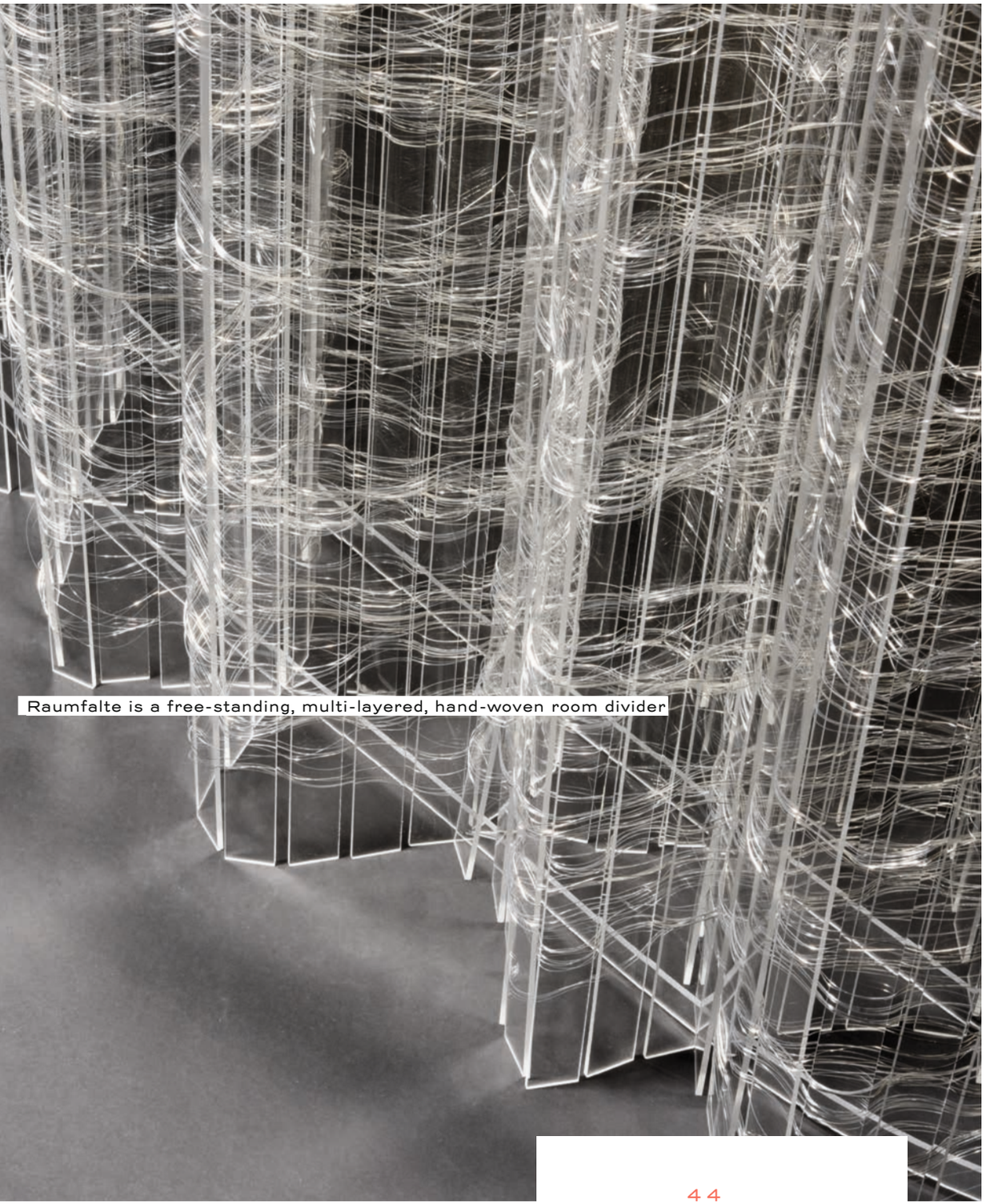
HILANDERIA
SARA DIAZ RODRIGUEZ
2015

Hilanderia means spinning in Spanish, and it was exactly this process that Sara Diaz Rodriguez wanted to interpret anew in her MA project. Instead of focusing on a textile finishing process, Diaz chose to go back further in Hilanderia to the yarn production. A fabric assumes its form and character based on how its yarns have been designed and manipulated. The appearance of the fabric is determined by the composition of its yarns. In the project Hilanderia digital media support the analogue processes of fabric design.

From a hand-made machine, a slub yarn is produced, whose thickness is controlled by a digital program. Nevertheless the result is still partially influenced by nature, as each and every wool fibre has its own character. The project was also inspired by the parallels between weaving and information technology: both are systems based on binary codes, which therefore enables the transmission of information between the two mediums.

HILANDERIA

The yarn's thickness is controlled by digital programming in this hand-made spinning machine



Raumfalte is a free-standing, multi-layered, hand-woven room divider

RAUMFALTE
HENRIETTE ACKERMANN
2015

Raumfalte is a research project dedicated to the topic of developing a free-standing woven fabric, with the help of traditional hand weaving techniques. In this MA graduate project, the main objective was to design a textile which solely due to its construction and its material can stand by itself. Throughout this project, the potential and boundaries of hand-weaving were researched and developed further. Raumfalte can be imagined as a flexible, textile interior wall or as a room divider, which unites both architectural and textile qualities.

All samples which arose from the project were woven on traditional hand looms. Several fabric samples are multi-layered weaves. That means, that multiple layers of fabric are simultaneously woven within the fabric structure. Thus three-dimensional honeycomb-like structures can be incorporated. These enable a great stability and additionally allow one to combine different materials with one another. The final piece was made from acrylic bars and Nylon thread and woven in three layers on a large hand loom.

In cooperation with the Saxon Textile Research Institute (STFI) and Maria Rakel.

RAUMFALTE

BEADS PLEASE
JUSTINA MONCEVICIUTE
2015

In her MA project 'Beads Please', Justina Monceviciute explores traditional beadwork techniques and challenges their application possibilities. She took inspiration from spherical patterns in nature and architecture, as well as the experimental designs of Issey Miyake (i.e. Pleats Please). Utilising ceramic and glass-blowing techniques, each hand-made bead is arranged into patterns following traditional beadwork construction methods.

Her investigations resulted in a collection of beaded garments which display both flexibility and stability in their structure. Elastic yarns provided the beadwork with textile-like characteristics, allowing the pieces to be folded or re-shaped. Whereas beads are usually a decorative element of fashion, here they are instead integral to the entire structure of each piece. Each armour-like garment projects toughness, despite being made from very fragile materials.

BEADS PLEASE

Flexible fashion surface created from hand-made, ceramic beads

Cement-filled textile sleeves are knitted, woven or knotted, to form a stable structure

CONCRETE TEXTILE
ANNE KATHRIN KÜHNER
2016

Concrete Textile is a material research MA project combining the contrasting properties of concrete and textile into new structures. Concrete has a good performance when compressed, as does textile when stressed. If both materials work together, a structural composite is formed that can bear loads without breaking. An oversized ›yarn‹ is made from textile sleeves that are filled with high performance cement and is then either knitted, woven or knotted into a larger textile structure. The tools for this kind of oversized crafting were also built by Anne Kathrin Kühner herself. After watering and curing the concrete, the material hardens into a textile-reinforced concrete structure. According to the construction technique applied, the final surfaces perform differently. The weaves and knits are extremely stable and can be freestanding textile structures, the knotted piece on the other hand becomes a flexible concrete surface that can be used as a concrete carpet or curtain. Mechanical material tests were carried out investigating the materials' performance data.

In cooperation with the Saxon Textile Research Institute (STFI) and G.tecz Kassel.

CONCRETE TEXTILE

CONSISTENCIES
DESIGN PROJECT

2015

Consistencies is a transformative menu, an imaginative food ritual, designed by students from the departments of Textile and Surface Design and Product Design. The design takes its inspiration from edible material – food – which undergoes in its preparation process various transformations. Chemical and physical processes change matter from solid to liquid, light to dark, colourless to colourful, or hard to soft. The curated menu portrays not only the change in consistency of edible materials, but also the space, the table and tableware present materials as a sensory experience, which alters course by course. The courses content include Flambé Punch, Hemisphere Mix, Surprise Eggs, Bento Box Gratin and Colour-changing Moments. Various forms of glass and water were illuminated, and the evening was accompanied by the extraction of essences through a bespoke apparatus.

CONSISTENCIES – A TRANSFORMATORY MENU

The Consistencies Menu and Installation was initially exhibited in February 2015 at the Berlin Restaurant/Gallery Zagreus Projekt, whose owner and chef Ulrich Krauss provided culinary input and support. The project was initiated and supervised by Prof. Christiane Sauer, Prof. Barbara Schmidt (Product Design) and Ursula Wagner.

Consistencies has been on tour, with an appearance at Burg Giebichenstein Kunsthochschule in Halle and as a part of the exhibition Table Talks at Helsinki Design Week. The production was supported by KAHLA/ Thüringen Porzellan GmbH and the Farbglashütte Lauscha GmbH.

SANS CUILLÈRE

SANS CUILLÈRE

NATASCHA UNGER, IDALENE RAPP,
LAURA GÖRS, MARIA BRAUN

These bowls are porcelain hemispheres of different sizes. They balance their liquid content either wobbling on the table, or nestling in the user's hand. All food served is white like the porcelain; different ingredients and spices can be added to a warm, white tomato soup.

Foto: ©HB Weissensee

KONSISTISCH & EGG‹

KONSISTISCH & EGG‹

REBECCA SCHRANKL, YOLANDA LEASK, PHILIPPA MAASWINKEL, FRIEDERIKE MEINECKE

The table is not only a mere functional surface, it becomes a design surface of its own. Surfaces of different consistencies interact with table tools and objects. They react to touch, heat or sound differently as backdrop for porcelain or glass tableware. In combination with the different served courses the black surface materials form an ideal background for curated courses such as ›eggs surprise‹.

Foto ©Hanns Joosten

MOMENTS

MOMENTS

MAHO HORIUCHI, AYUMI AYABE

Ice is melting and starts dripping. It reacts with the jelly deserts, causing a slow change in colour. Like an edible drawing, the change of consistency and the passing of time is made visible.

Foto ©Hanns Joosten

BLOW UP
DESIGN PROJECT

2015

Designing with air was the theme for the interdisciplinary semester project Blow Up supervised by Prof. Christiane Sauer, Marco Canevacci (plastique fantastique, Berlin) and Ursula Wagner. Air is omnipresent and yet intangible. As a ›material‹ it is incredibly versatile: it can support, insulate, buffer, transport, destroy or stabilize. The project investigates different ways to design with air pressure, also focusing on aspects of functionality. The membrane materials utilized were manipulated, combined and tailored in order to achieve the desired performance. A wide range of various constructions from lighting devices to spatial enclosures were created, supported by air pressure alone.

For the annual summer exhibition the outcome was showcased in the campus garden of our Art Academy. The designs took on a life of their own, being used as amusement or pop-up party spaces by students and visitors alike. The design project group consisted of students from Textile and Surface Design, Product Design and Fine Art Sculpture in this architectural endeavour.

BLOW UP

OSZILLATION

OSZILLATION
NATASCHA UNGER,
IDALENE RAPP

Oszillation reflects and transforms the viewers perception by oscillating between translucency and opacity due to lighting conditions. A thin Mylar foil acts as an atmospheric catalyst, creating a magic space.

Foto ©Hanns Joosten

DROP

DROP
MARIA TURIK

Drop acts as a semitransparent sculpture that can be experienced, but not accessed. The empty interior space becomes a communicating device for people peeping through the slots in the translucent skin.

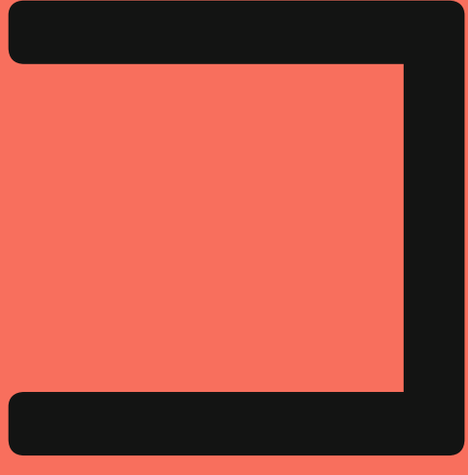
Foto ©Maria Turik

NTF

NTF
HENRIK HJORT, SIMON ERTL,
MARVIN OGGER

NTF uses standard industrial LD-PE foil tubing which comes in free lengths from the roll. The material is combined with an industrial net to shape the inflated linear tube elements. Different layouts and fixing points allow to create instantly big structures for spatial partitions or moveable objects.

RESEARCH PROJECT
SMART^3



BMBF RESEARCH PROJECT

The department of Textile and Surface Design is a partner in the research project smart³ - materials, solution, growth, funded by the German Federal Ministry for Education and Research (BMBF). Smart³ aims to accelerate the development of new, innovative products using smart materials. The interdisciplinary project is led by the Fraunhofer IWU in Dresden.

Smart materials are materials which possess the ability to independently adapt to changing environmental conditions, or deliberately change their properties according to outside influences. The technical complexity of a product can be implemented directly through its material, and thus create a structurally simple product with highly complex functionality. In total, 31 different partners from scientific institutions, industry and academia are working together on intelligent solutions for innovative products, applications, and processes, that make best use of the outstanding properties of ›smart materials‹

SMART³

Smart³ focuses on four shape-changing materials:

- Thermal Shape Memory Alloys are metal wires or sheets which are trained to change shape when they encounter heat (based on a pre-defined temperature), requiring no power supply. They are very lightweight in relation to their performance.
- Magnetic Shape Memory Materials can change their form under the influence of a magnetic field. They are suitable for use as actuators, for generating small amounts of electricity, or as sensors.
- Dielectric Elastomer Actuators distort when tension is applied and has uses in the fields of actuator and sensor technology, or in energy conversion. DEAs are light, very compact and switch both quickly and silently.
- Piezoceramic Materials demonstrate a separation of electrical charge, or electrically charged areas when under the influence of mechanics. They can be used not only as a sensor, whose reaction time is extremely short, but also can be implemented for generating energy.

smart³ project Team at Weißensee Academy of Art Berlin:
Department of Textile and Surface Design
Experimental Materials Research
Prof. Dr. Zane Berzina, Prof. Dipl.-Ing. Christiane Sauer,
Dipl.-Des. Veronika Aumann, Dipl.-Des. Julia Wolf

More information:
www.smarthoch3.de
www.kh-berlin.de/hochschule/forschung/smart3.html

Bundesministerium für Bildung und Forschung

zwanzig20 PARTNERSCHAFT FÜR INNOVATION

smart³ materials solutions growth

SMART TOOLS FOR SMART DESIGN
SYNERGIES BETWEEN DESIGN AND TECHNOLOGY
USING EXAMPLES OF SMART MATERIALS
2015 - 2016

The Project Smart Tools for Smart Design is dedicated to smart materials, which have the ability to change their shape if subject to an external stimulus.

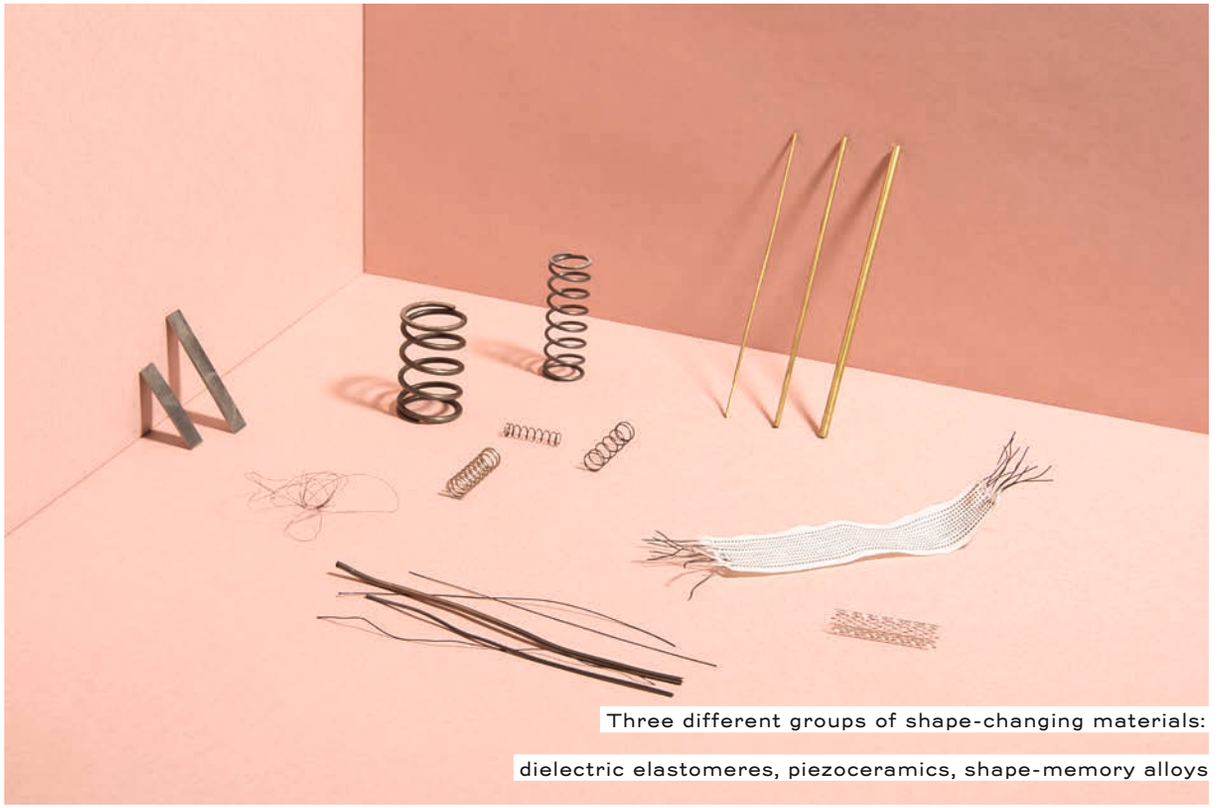
With smart materials, function and material are at one, enabling totally new design possibilities. In order to provide designers with easier access to the complex technical knowledge about smart materials, a special tool-kit has been created as part of the research project, which works with the visual and verbal language of the designers. It bridges the gap between the two disciplines of design and science, encouraging collaboration and exchange, in order to generate innovative ideas and solutions.

SMART TOOLS FOR
SMART DESIGN

The project was carried out from December 2014 until May 2016 by the department of Textile and Surface Design of Weißensee Academy of Art Berlin, in cooperation with the Fraunhofer Institute for Ceramic Technologies and Systems (IKTS) in Dresden, as well as the Fraunhofer Institute for Applied Polymer Research (IAP) in Potsdam-Golm, under the project coordination of the Fraunhofer Institute for Machine Tools and Forming Technology (IWU) in Dresden.

Smart Tools for Smart Design was supported by the German Federal Ministry of Education and Research (BMBF) within the framework of the innovation initiative »Unternehmen Region«, »20zwanzig - Partnerschaft für Innovation« and was carried out within the framework of the research consortium smart3 | material – solution – growth.

www.st4sd.de



Three different groups of shape-changing materials:

dielectric elastomeres, piezoceramics, shape-memory alloys

Fotos: ©Julia Wolf

ST4SD

SMART TOOLS FOR
SMART DESIGN

Foto: © André Wunstorf

ST4SD

The Smart Tools are composed in a range of formats based on each other: functioning clips, case study collection, material explanation cards, demonstrators, DIY instructions, search tool / database and online platform.

CHANGE
DESIGN PROJECT
2014

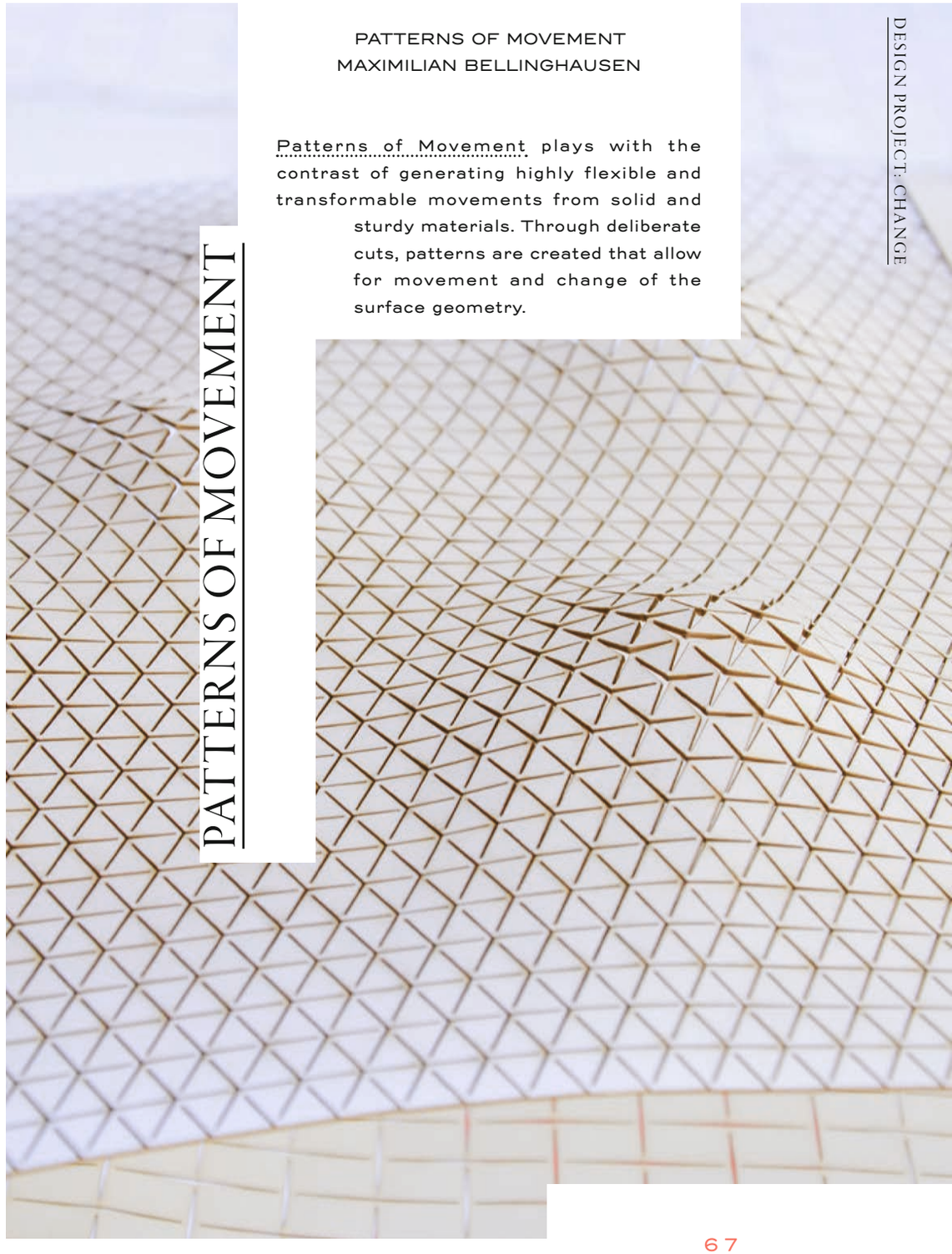
Within the framework of the research project smart³, the department of Textile and Surface Design cooperated with the Fraunhofer Institutes for Applied Polymer Research (IAP) in Potsdam, for Machine Tools and Forming Technology (IWU) in Dresden and for Reliability and Microintegration (IZM) in Berlin, as well as with the Saxon Textile Research Institute (STFI) in Chemnitz.
The CHANGE project was supervised by Prof. Dipl.-Ing. Christiane Sauer, in cooperation with Prof. Dr. Zane Berzina, Dipl.-Des. Veronika Aumann and Dipl.-Des. Julia Wolf.

CHANGE

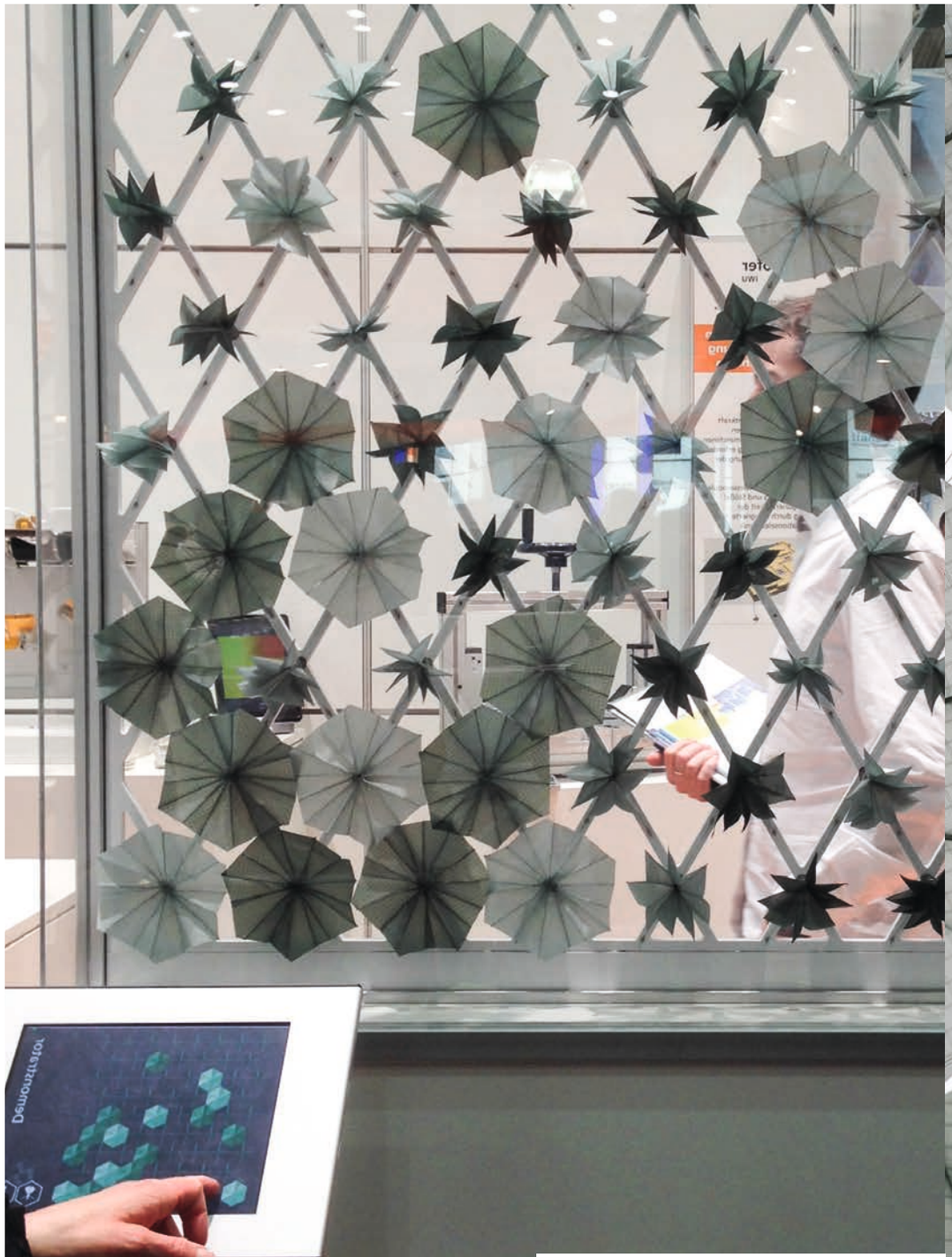
Changeable, adaptive surfaces are numerous in nature and the environment. Protective functions, camouflage, adaptability, metabolism or the exchange of energy are enabled through reactive shells, skins and membranes. In this project, principles of surface transformation and their possibilities for application were investigated within the context of body (clothing), or space (furniture, interiors, architecture). The emphasis was on the integration of ›intelligent‹ materials, which are able to independently adapt to their changing environment, or change their properties according to external influences. They enable extra functionality and simultaneously are a catalyst for new design prospects. During the CHANGE project the students dealt with shape-changing materials, whose potential for design should be explored (shape memory alloys, piezoceramics, dielectric elastomers). The aim was to develop innovative designs for textile or non-textile changeable surfaces.

PATTERNS OF MOVEMENT
MAXIMILIAN BELLINGHAUSEN

Patterns of Movement plays with the contrast of generating highly flexible and transformable movements from solid and sturdy materials. Through deliberate cuts, patterns are created that allow for movement and change of the surface geometry.



PATTERNS OF MOVEMENT



SOLAR CURTAIN

SOLARCURTAIN
BÁRA FINNSDÓTTIR

The innovative sun screen design SOLARCURTAIN is composed of many shielding blossom-like modules made of ripstop nylon fabric, which are attached to a light and dynamic net structure of braided nylon yarn. If the sun heats up the surface, the modules open up and give shade to the space lying behind. Shape memory alloy wires, which react to heat, are joined to each module. When the temperature reaches approx. 30°C, the wires begin to contract and pull the modules open. When the temperature reduces, the modules return to their original state due to small springs. The modification of the surface, as a consequence of the temperature change, turns the solar curtain from a very open, transparent surface to a closed, protective screen, intended to be installed at a glazed facade to provide shading for interior spaces on sunny days.

Furthermore the study project was transferred into a functional prototype in cooperation with Fraunhofer IWU Institute and was displayed at the 2015 Hannover Messe. It also won the national Fraunhofer Idea Competition in 2016. The demonstrator can be activated not only by ambient heat, but alternatively also by electric signals. A touchscreen is used as an interface for individual actuation of the performance.

FOLDING GRIDS

FOLDING GRIDS
NINA FABERT

Folding Grids demonstrates how from a simple folding element, a surface can be created, which is expandable in all directions. The structure of the modules can be realised in both flexible and rigid materials. This three-dimensional flexible element can be used as an adaptive shading device.

STRETCH KNIT

STRETCH KNIT
THERESA KRETSCH

Stretch Knit explores the possible dimensions of knitting. Through various techniques, textiles are created which take on new forms through horizontal or vertical stretch, and thus change their appearance. Through the integration of shape-memory-alloys in the knit, the shape change can be controlled via energy input.

LABORATORY FOR INTERACTIVE TECHNOLOGIES

The Laboratory for Interactive Technologies: eLab – is set up as an experimental, interdisciplinary research platform and workshop, in order to explore the artistic and design discourse on the role and possibilities of media and information technologies.

eLAB

These technologies play a part in ever more areas of our lives: after a phase of digital abstraction, which was dominated by the screen and mouse, a more mature digital technology is now turning back to concrete, tangible things. This changes the perception of and the manner of dealing with artefacts fundamentally: artefacts develop an additional medial dimension, are networked, have a memory or are even intelligent. Digital technology becomes tactile again, and this neoanalogue tangibility must be designed. Not the technical innovations, but particularly intuitive and plausible forms of interaction determine the success of these new concepts – be it in the field of information communications, product design or that of intelligent textiles.

The design requirements are becoming more demanding. Aside from the design of the physical object, the physical context of use, the visual appearance, also the invisible functions and characteristics provided by these new products must be designed in such a way as to be managed and experienced by the user. While it is established that designers play an essential role in the development of physical products, or their graphic appearance, it is now slowly being recognized that complex user processes must also be equally carefully designed, so that they possess an aesthetic dimension and contribute to the success of the product. In an university context, this means that besides classic simulation and model-building techniques for which there are the appropriate workshops, we require a new infrastructure, which allows ›hard- & software sketches‹ to be created. The eLab makes it possible to test prototypes of product-, function- and interface-concepts through electronic mock-ups, and to empirically-iteratively refine the interaction scenarios accordingly.

The inter-departmental concept of eLab ensures that innovative developments, which often lie exactly between classic subject areas, are viewed and addressed. The emphasis is on the experimental investigation, development and design of physical interfaces, such as interactive products and environments, interactive exhibits and media façades, wearable computing, but also the design and realisation of software applications like web-based mobile applications. In order to generate physical artefacts, which can incorporate electronics, the Laboratory for Interactive Technologies works closely with Weissensee's own Rapid Prototyping Workshop.

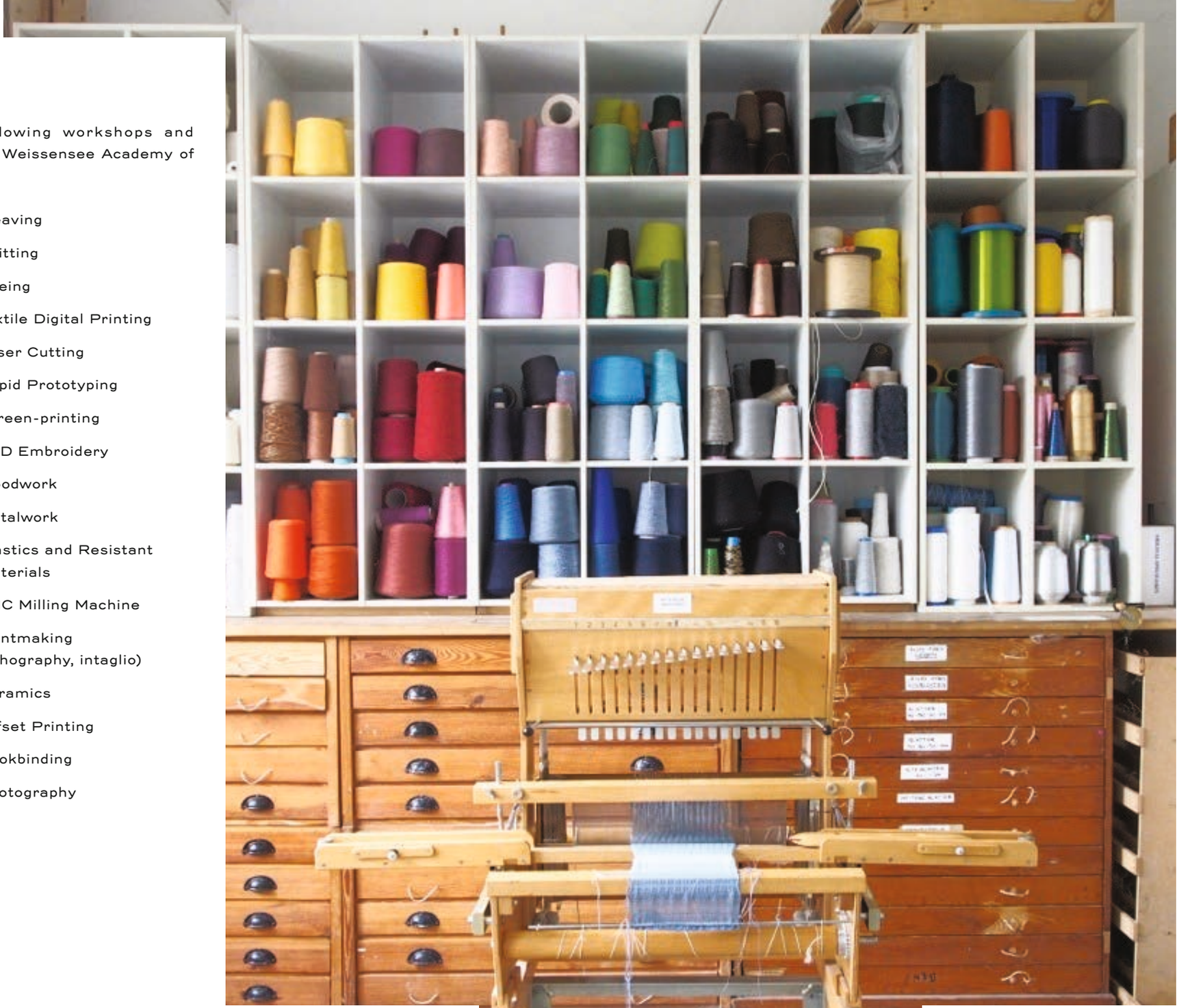
The intentions of GreenLAB are:

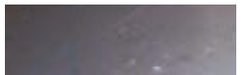
- to inform students and interested members of the public about existing sustainability concepts, strategies and products;
- to inspire and promote developments in this field through practice-led research and design methods;
- to give an informative and critical analysis of these developments by placing them into the wider ecological, economic, socio-cultural and technological contexts;
- to foster innovative and holistic solutions through interdisciplinary working methods, involving Textiles, Fashion, Product Design and Visual Communication.

Amongst others, the following workshops and techniques are available at Weissensee Academy of Art Berlin.

- ~ Weaving
- ~ Knitting
- ~ Dyeing
- ~ Textile Digital Printing
- ~ Laser Cutting
- ~ Rapid Prototyping
- ~ Screen-printing
- ~ CAD Embroidery
- ~ Woodwork
- ~ Metalwork
- ~ Plastics and Resistant Materials
- ~ CNC Milling Machine
- ~ Printmaking (lithography, intaglio)
- ~ Ceramics
- ~ Offset Printing
- ~ Bookbinding
- ~ Photography

WORKSHOPS





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IMPRINT

ONLINE VERSION

IMPRINT

Publisher
Prof. Dr. Zane Berzina
Prof. Dipl.-Ing. Christiane Sauer

Realization 2. Edition
Essi-Johanna Glomb

2. Edition
Berlin
2016

weißensee kunsthochschule berlin

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