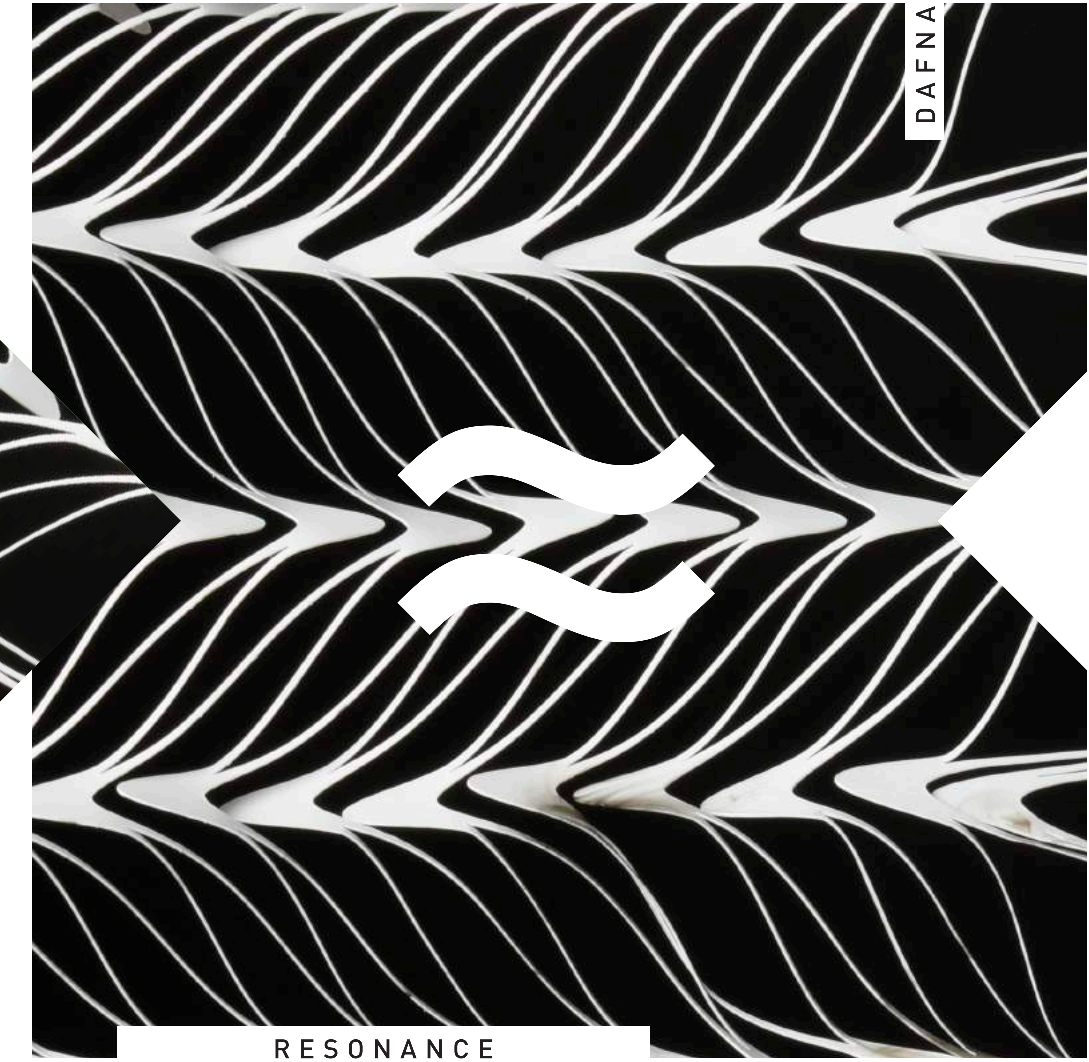
DAFNA STOILKOVA



RESONANCE

MATERIALITY & SENSORY RESEARCH

Textile & Surface Design, Summer 2015

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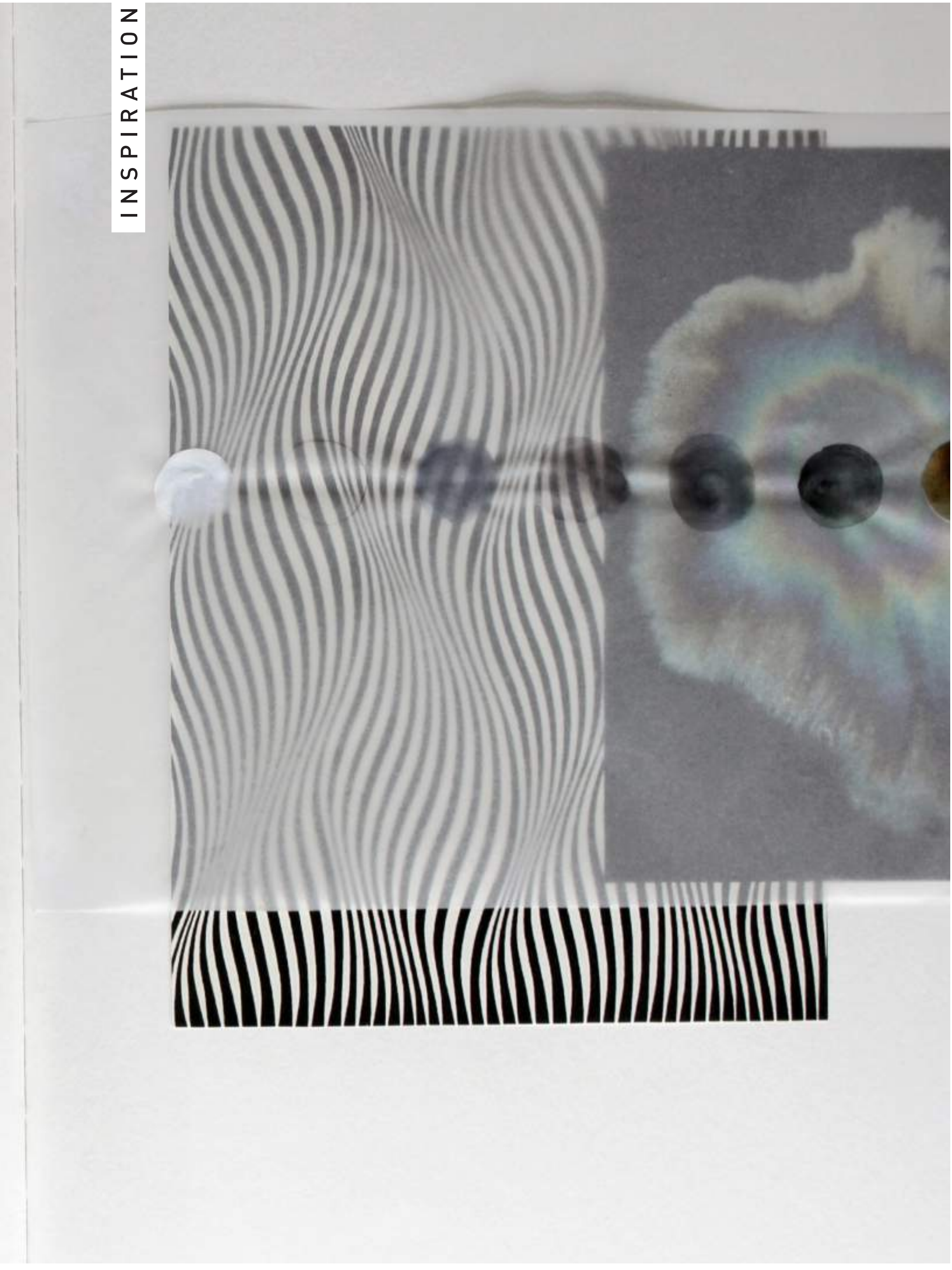


RESONANCE

Could naturalness be achieved with artificial materials?

At what point would the artificial turn into natural?

Is it possible to create inanimate material that behaves as if alive?

What is the nature of the world created by man?

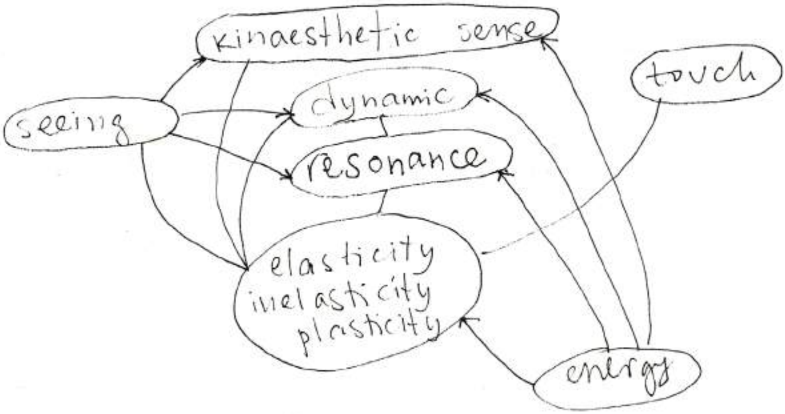
Could it be that life is a perspective of the senses?

The search for an expanded perception has led me to the idea of materials that interact with their environment independently. One possible interaction is motion. In the organic world, motion depends on the elasticity of matter. Could this rule also be applied to the "inanimate" world?

To answer this question, I have studied the transformation of non-elastic materials into elastic. I have designed regular geometric patterns to be cut into inelastic materials which would allow for expansion and change in shape. Each pattern was tested in materials with different strength and stiffness. Patterns of extreme curved lines, cut into thin, stiff plastic, have proved the biggest elasticity.

The results have led me to a further study of the sensory properties of these transformed materials. The elastic behavior of rigid materials allows movements that synchronize with their context at multiple levels - visual, tactile and kinesthetic. Implemented in polypropylene, polyester and acrylic glass, the resulting collection of materials fuses the conception of "artificial" with the unfolded organic sensory perception. A basic principle of the new aesthetics is that what is "natural" is determined by a precise prototyping.

In the context of the human body, the materials are synchronised with its movements. It may be that the geometry of the pattern, similarly to optical illusions, passively interacts with the psyche.
Could this result into a soothing resonance between body and material?
Could this resonance determine a new sensory functionality?


kinaesthetic sense
touch
seeing
dynamic
resonance
elasticity
inelasticity
plasticity
energy

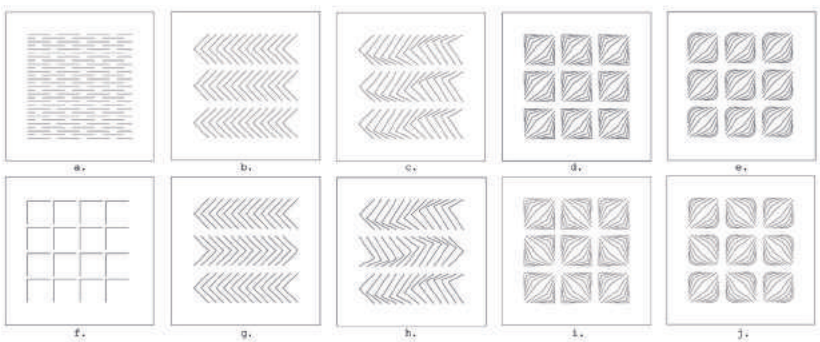
EXPERIMENTS

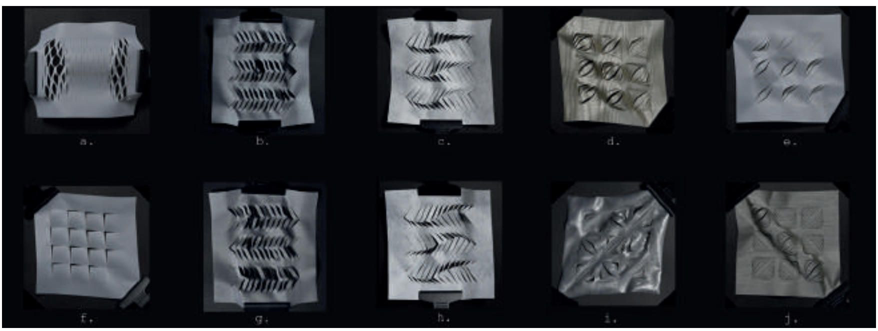
The aim of the tests was to transform inelastic materials into elastic. Different patterns were cut into various flat materials, without taking anything away from the material. Parameters for the comparison of elasticity were expansion, stress behavior and change in shape.

For the systematic study the cuts were made in recurring straight, rectangular and curved lines, which were distributed in varying sizes and distances over the surface.

Because of their best parameters, six patterns were tested on eight different materials. Patterns of strongly curved lines that are cut into thin and stiff plastic panels, show the greatest elasticity.

Test #1
Study of the basic principles of elasticity. Unexpanded and expanded patterns

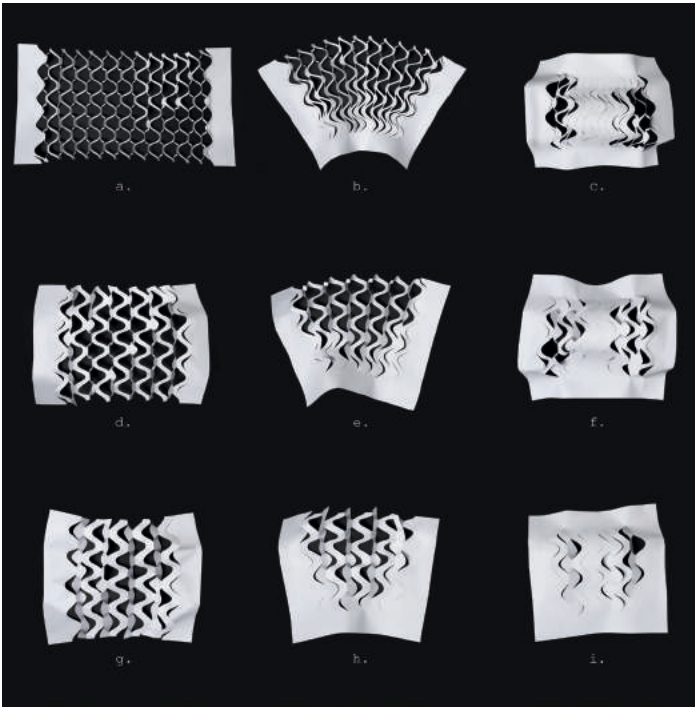


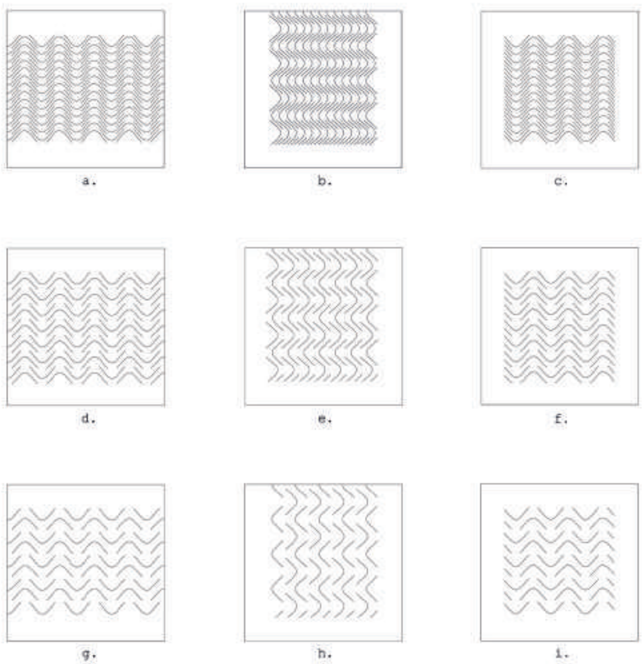


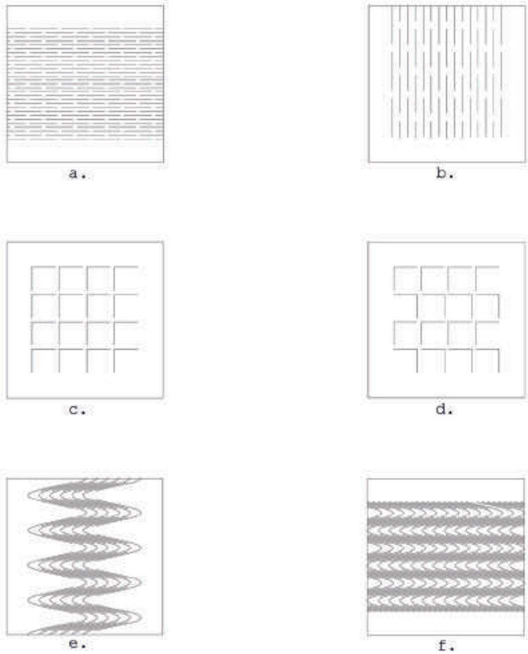
Test #2

Investigation of patterns by small variations in the recurring intervals

offset paper $80 g/m^2$

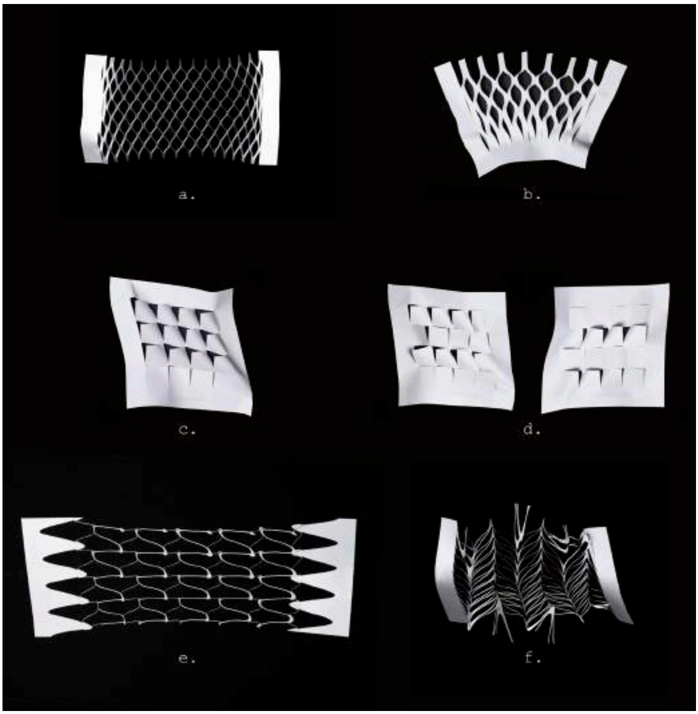


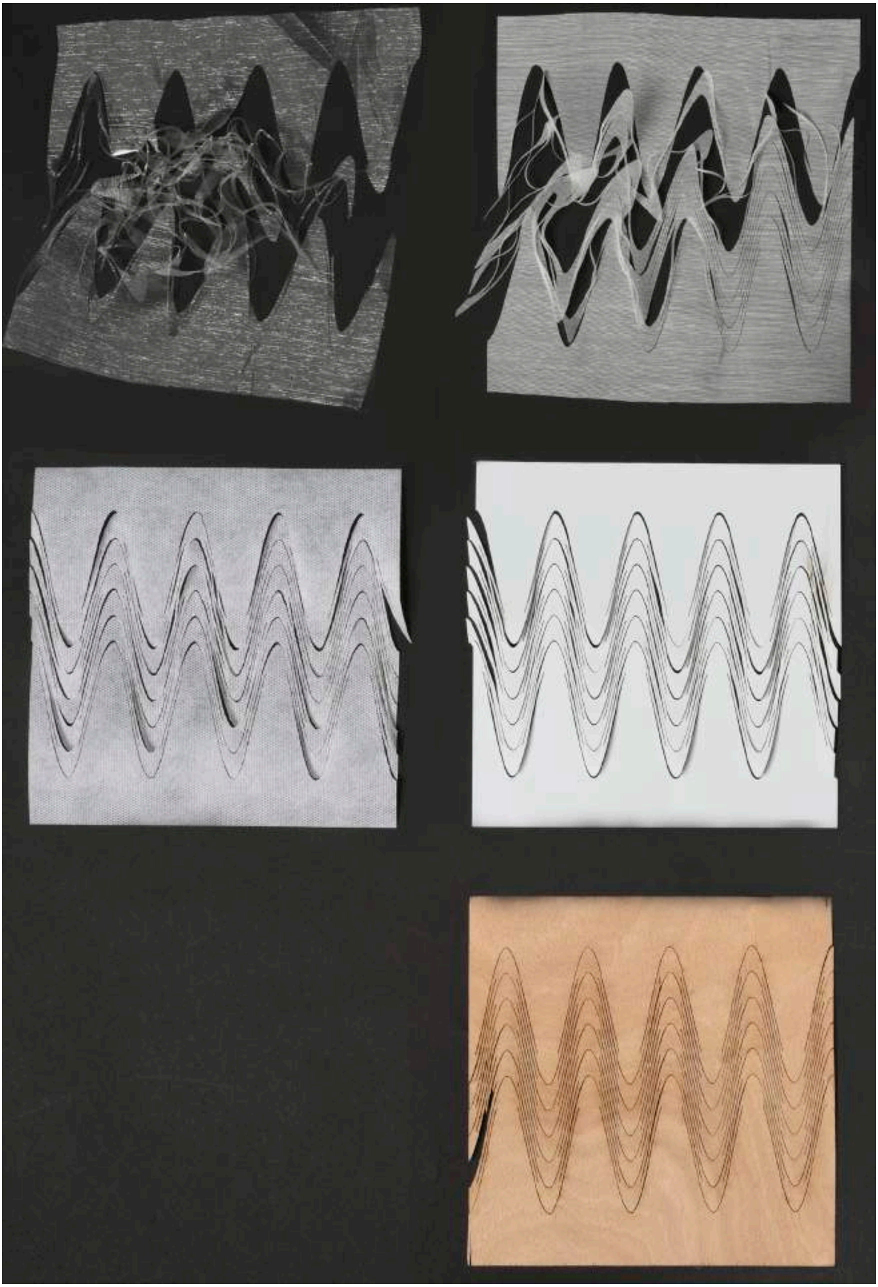




Test #2
Six expanded
elasticity patterns

offset paper 80g/m^2





Test #3
Elastic patterns cut
in different materials

woven organza
0.01 mm

woven polyester
0.1mm

woven polyester
0.1mm

non-woven polyacryl
0.1mm

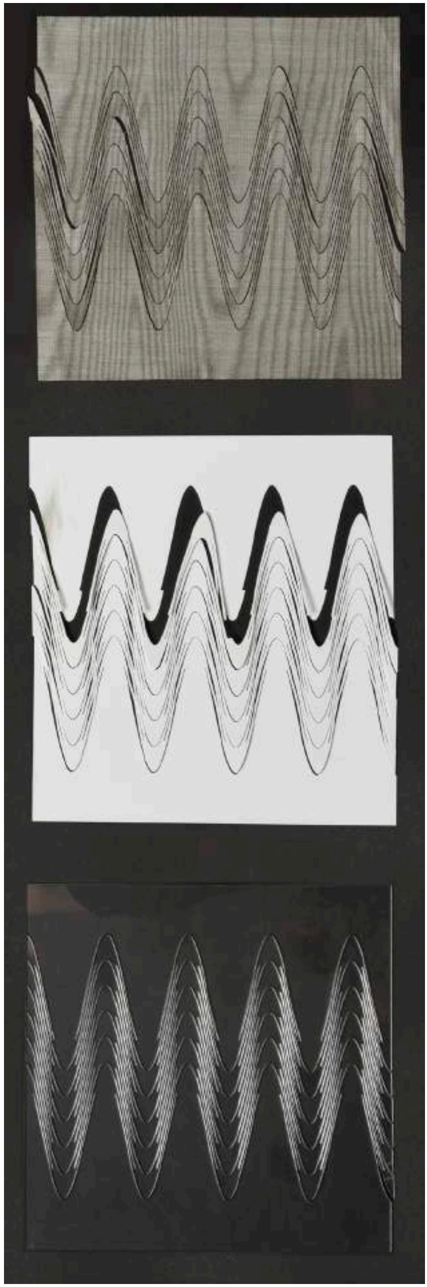
polystyrene
0.5 mm

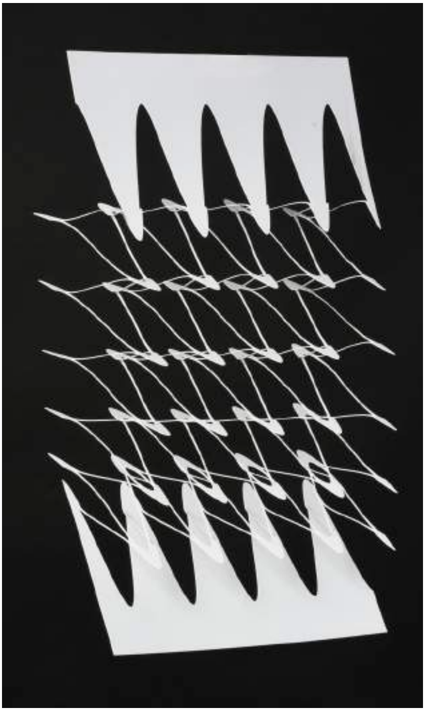
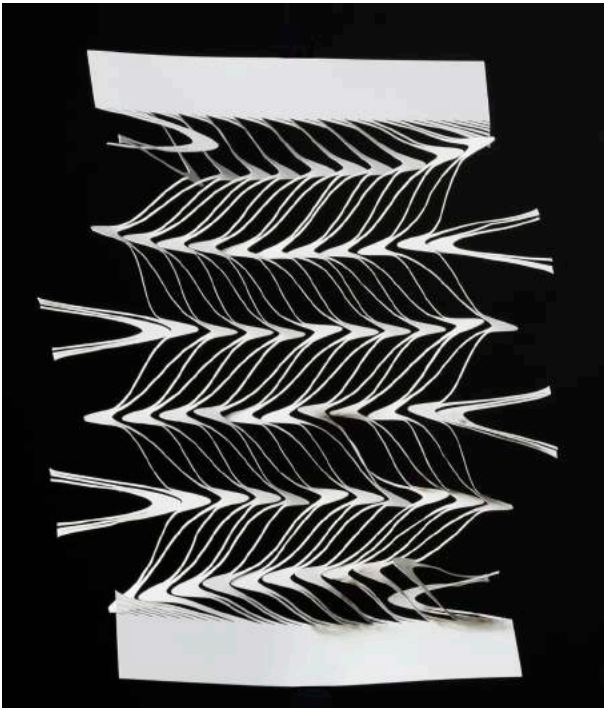
polystyrene
0.75 mm

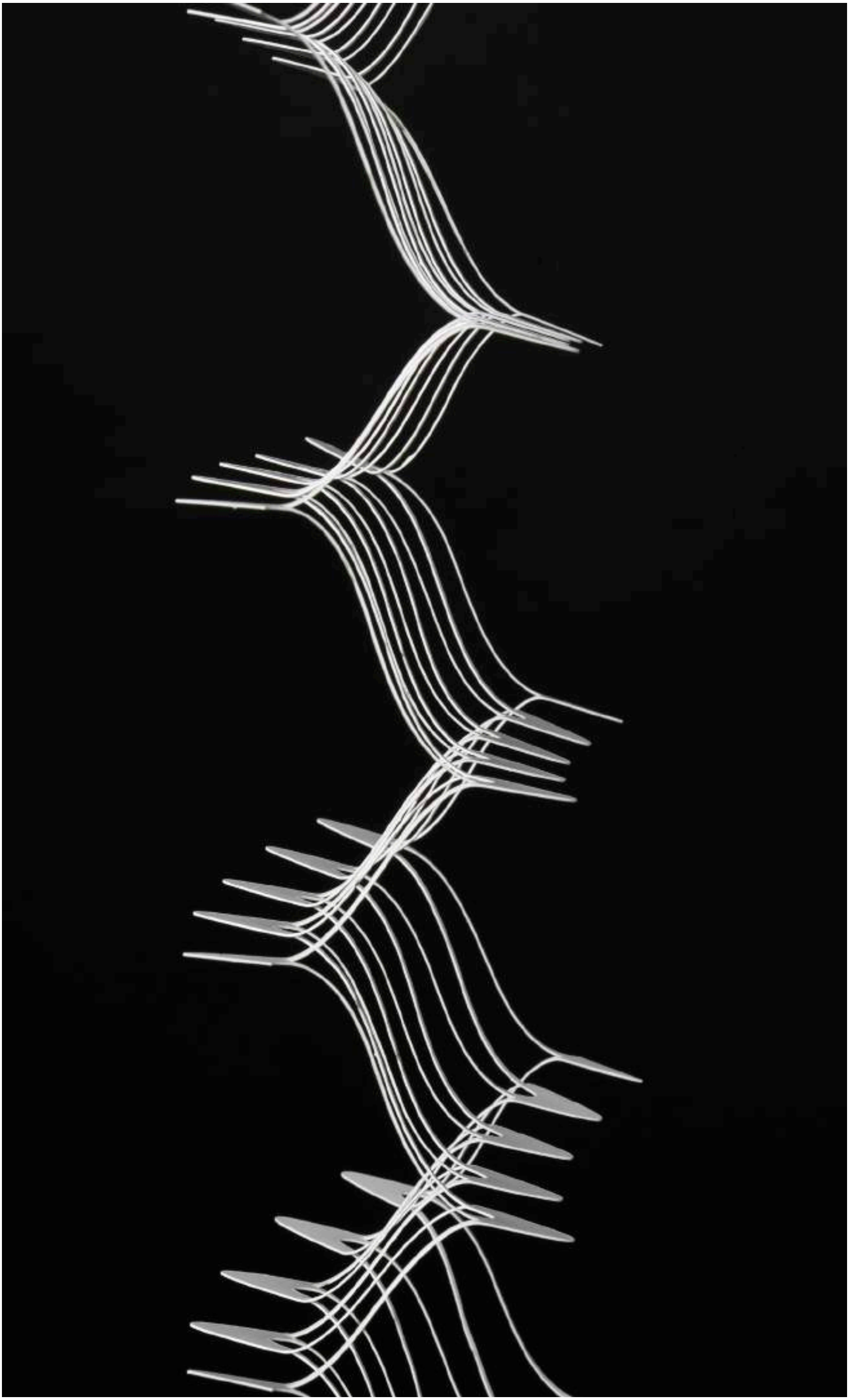
wood verneer
1 mm

acrylic glass
2 mm

EXPERIMENTS





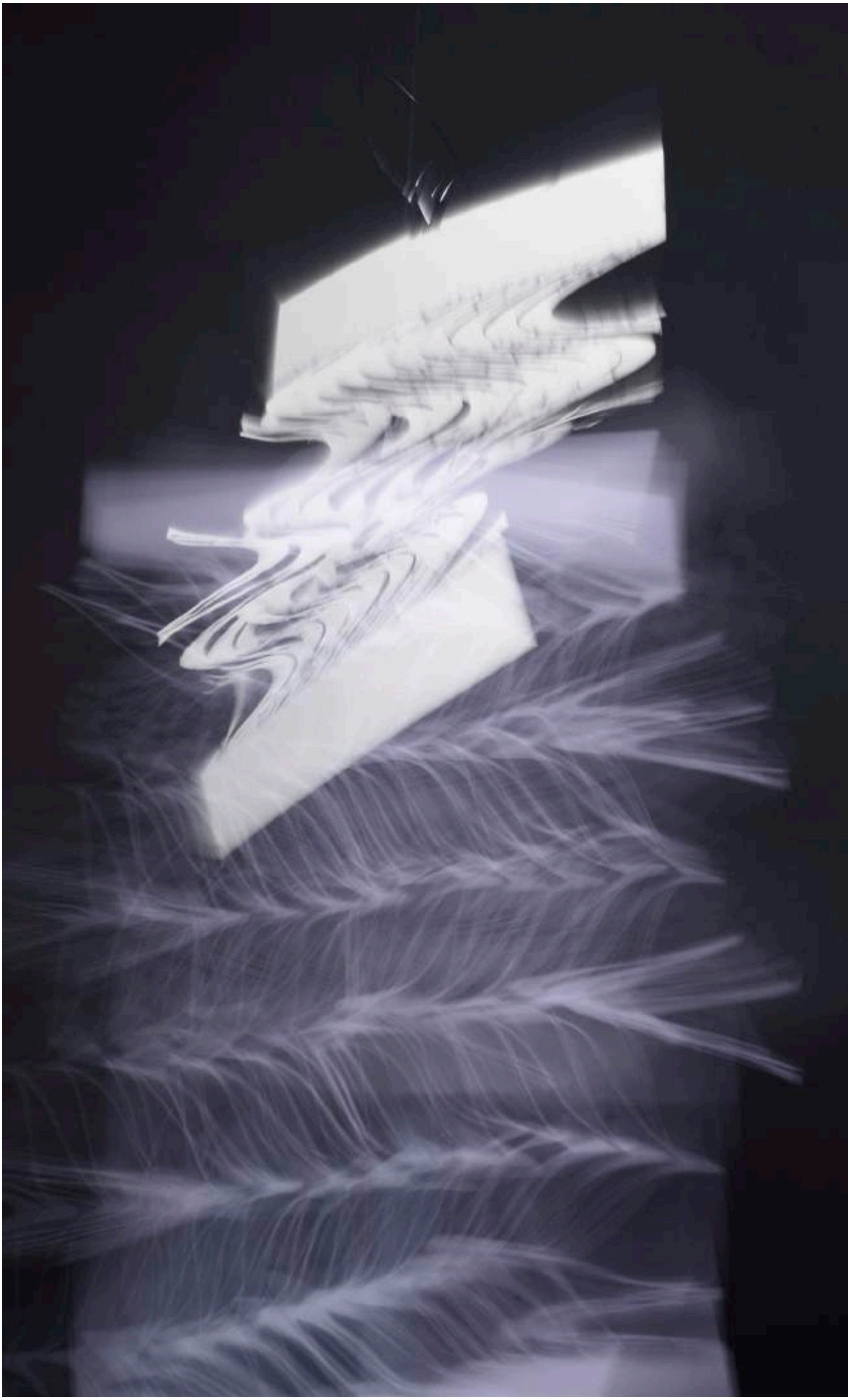
polystyrene 0.5 mm

top left

Expanded pattern of curved lines a.) vertikal and b.) horizontal

bottom left & right

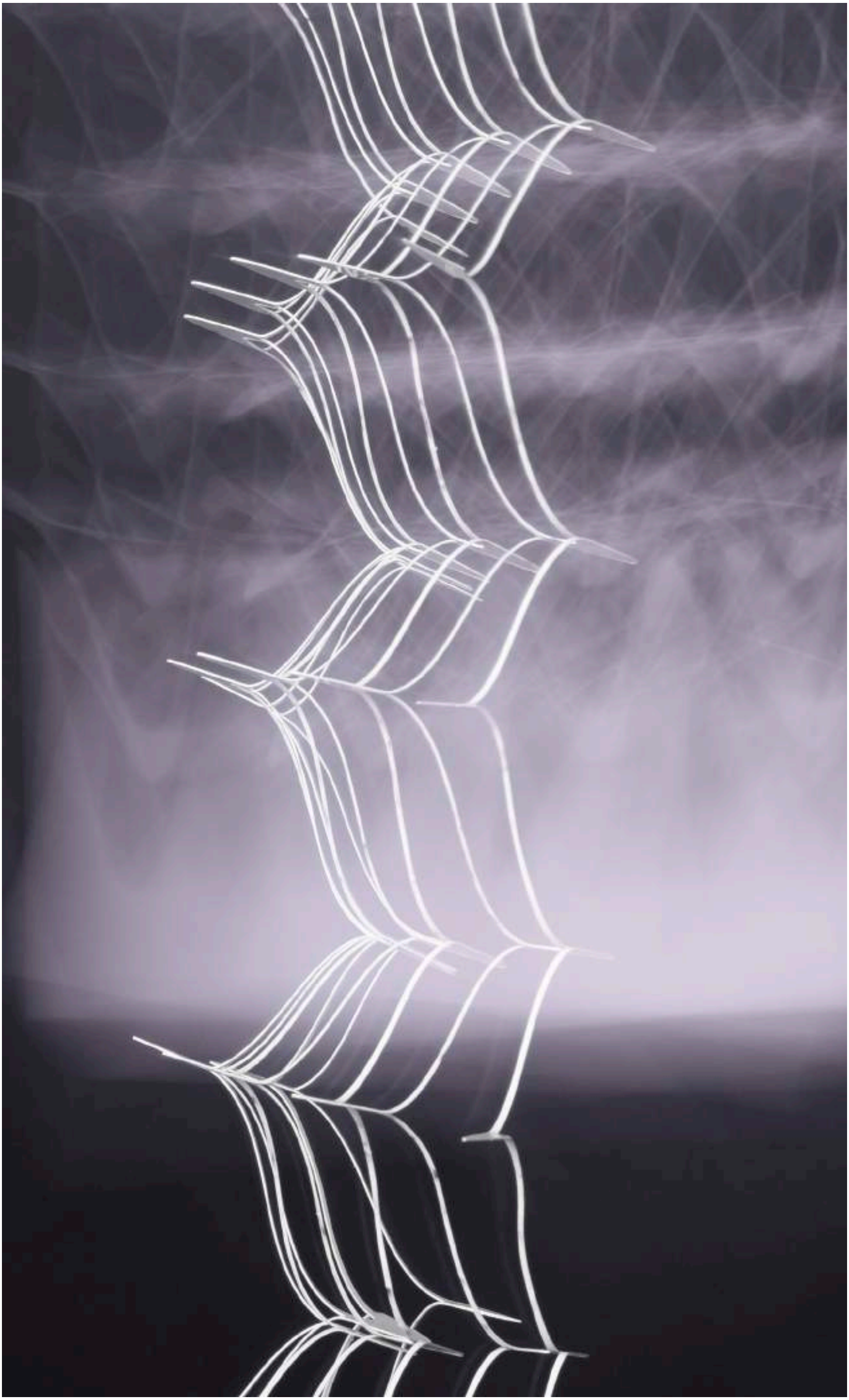
Three-dimentional structure of the expanded material



polystyrene 0.5 mm

both

Vertikal expanded pattern of curved lines in motion



After a series of material tests a pattern of strongly curved lines (75°) was selected and implemented on three large surfaces.

MATERIALS

In selecting these surfaces their strength was crucial. The filigree structures should be sufficiently rigid when expanded in order to support the entire weight of the surface when hanging. Suitable materials for this purpose proved to be polypropylene, polyester and acrylic, with each of their specific properties bringing forth a different character of the newly formed surfaces.

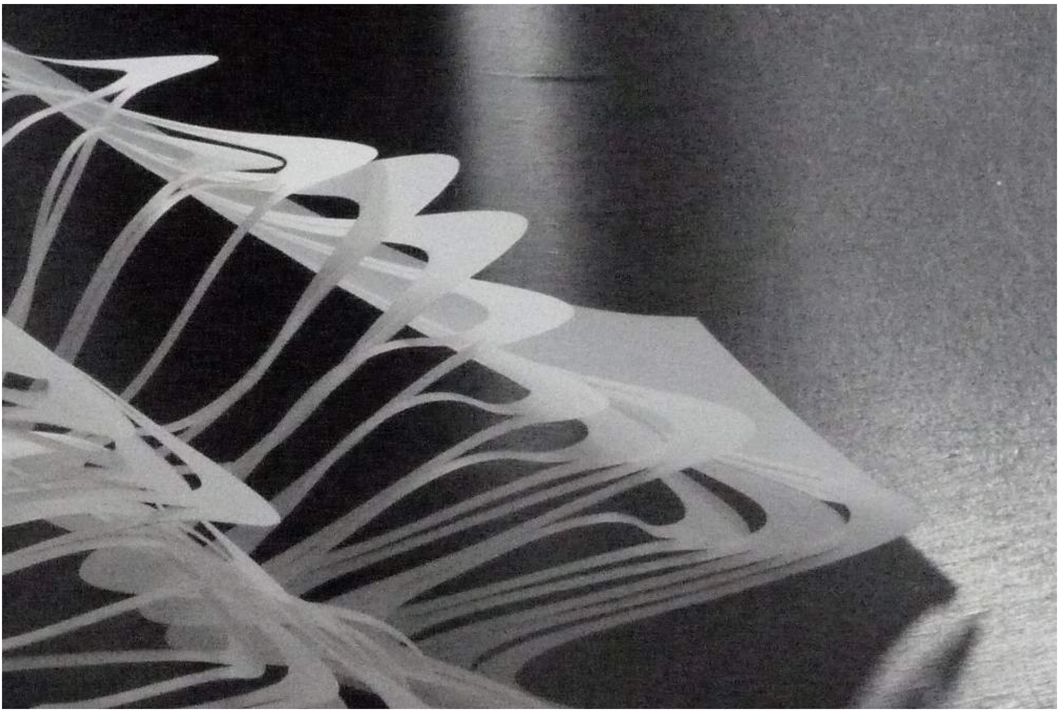
Adoption of form
polyester 0.1 mm

TECHNOLOGIES

The samples were cut by laser into the plastic sheets. Other possibilities for the production would be CAD 2D cutting and impressing.

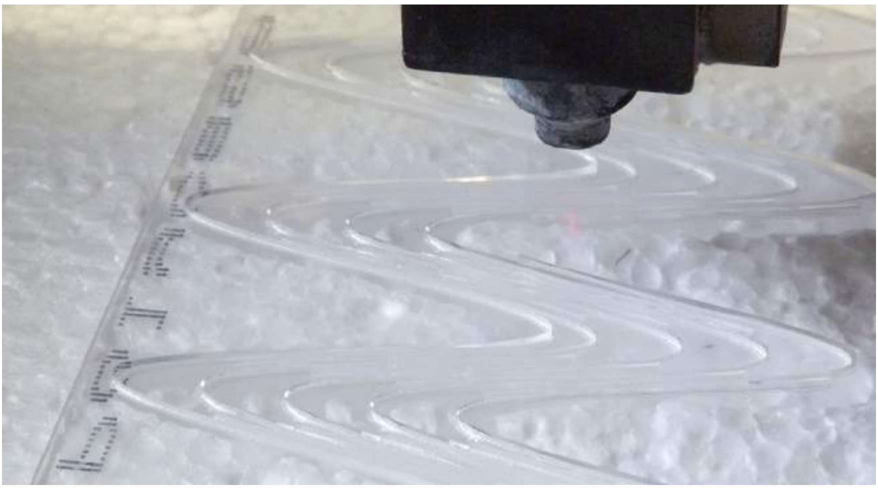
OTHER SENSORY EFFECTS

The variations in the quality of materials and laser cutting creates partially cut and partially engraved surfaces. This could oscillate like a picture puzzle between function and decoration.

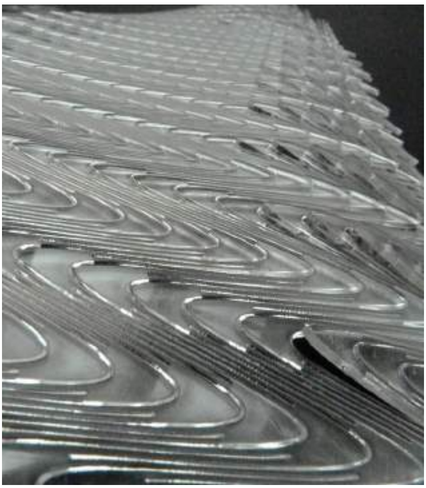


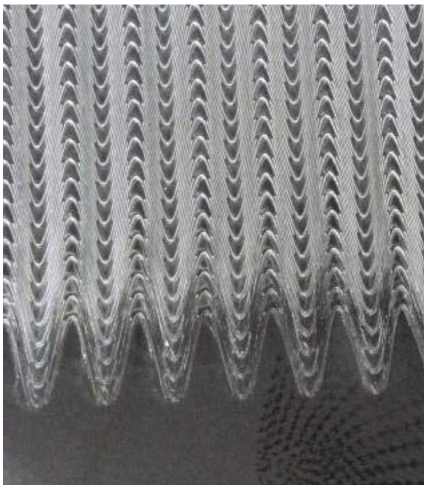
Materials
polypropylene 0.35mm, black; polyester 0.1mm, translucent white; acrylic glass 1.5mm, transparent

Technology
Laser test: setting the speed and power of the laser.
Sample:
acrylic glass 1.5mm, transparent



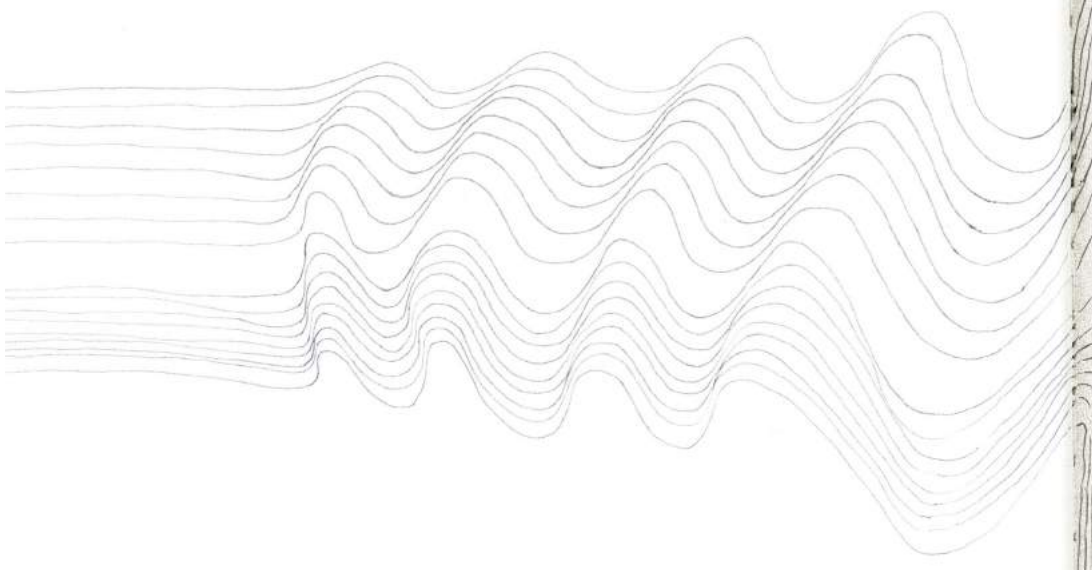
Technology
Lasercutting of acrylic glass 1.5mm.
Laser: Spirit GX



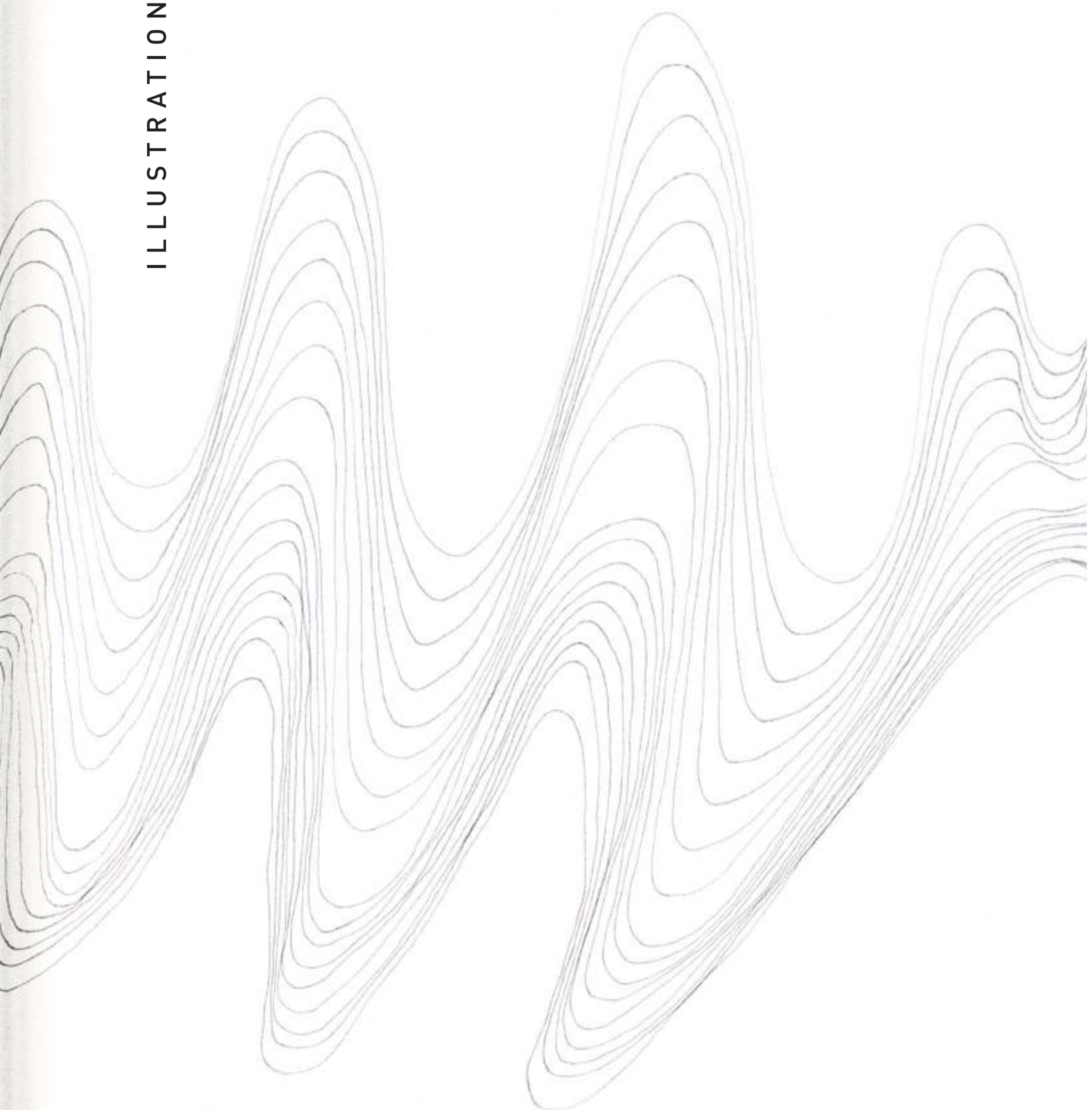


all

Other sensory effects
Cut and engraved lines - function and decoration

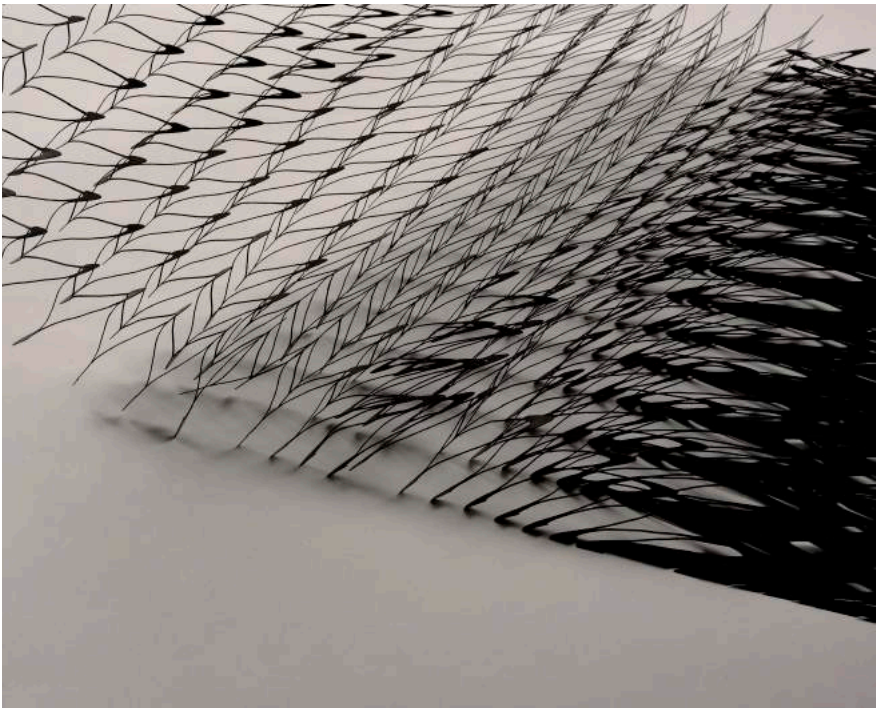


ILLUSTRATION



Surface #2
Pattern of 75°
curved lines,
polyester 0.1 mm,
40 x 300cm

(Details)



Surface #1
Pattern of 75°
curved lines,
polypropylene 0.35 m,
67 x50cm

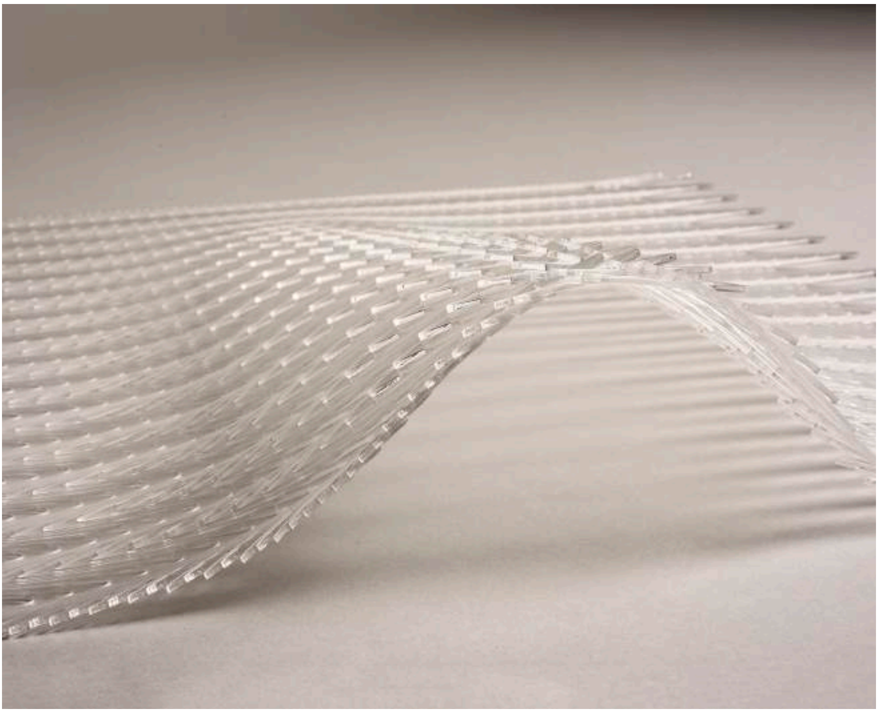
RESULTS

The same pattern of high elasticity creates three transforming surfaces.

The surface of polypropylene (#1) is highly elastic, yet strong, which determines its highly kinetic character.

The polyester surface (#2) is softer and more dynamic, thus producing a liquid, ever-changing image.

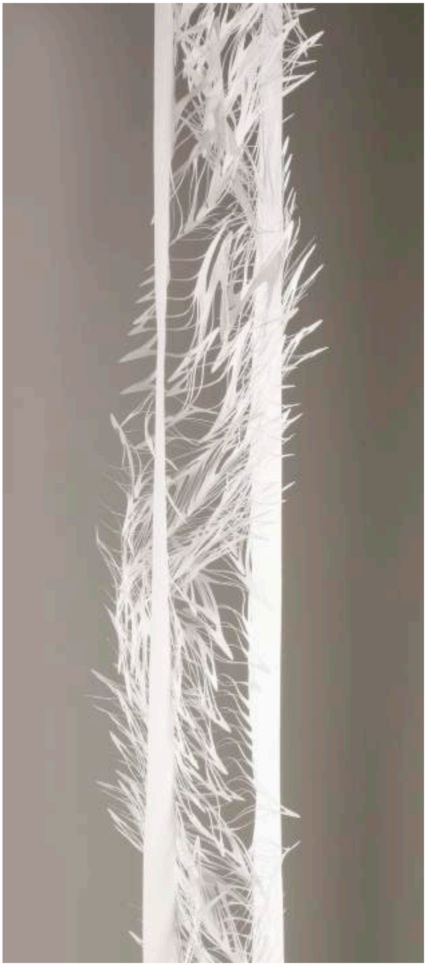
The acrylic surface (#3) conveys a stronger tactile component with limited mobility.



Surface #3
Pattern of 75° curved lines, acrylic glass 1.5 mm, 45x80cm

The potential for the transformation both of their shape and structure makes these materials suitable for dynamic contexts. Due to their optical, haptic and kinesthetic language they can relate to spaces as well as resonate with with the human body.

Could these materials not only reflect, but also bring forth their contexts?

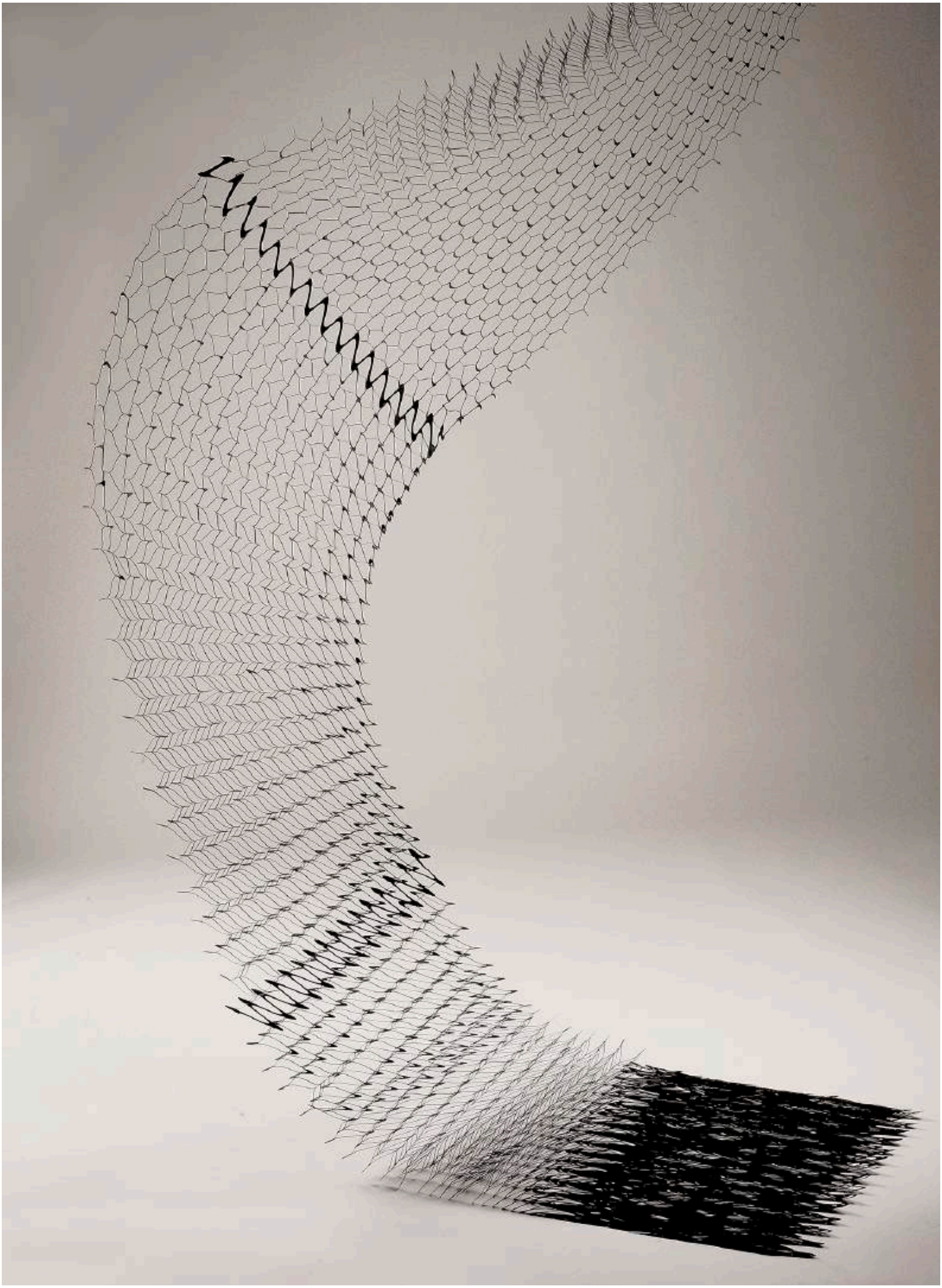


left, both

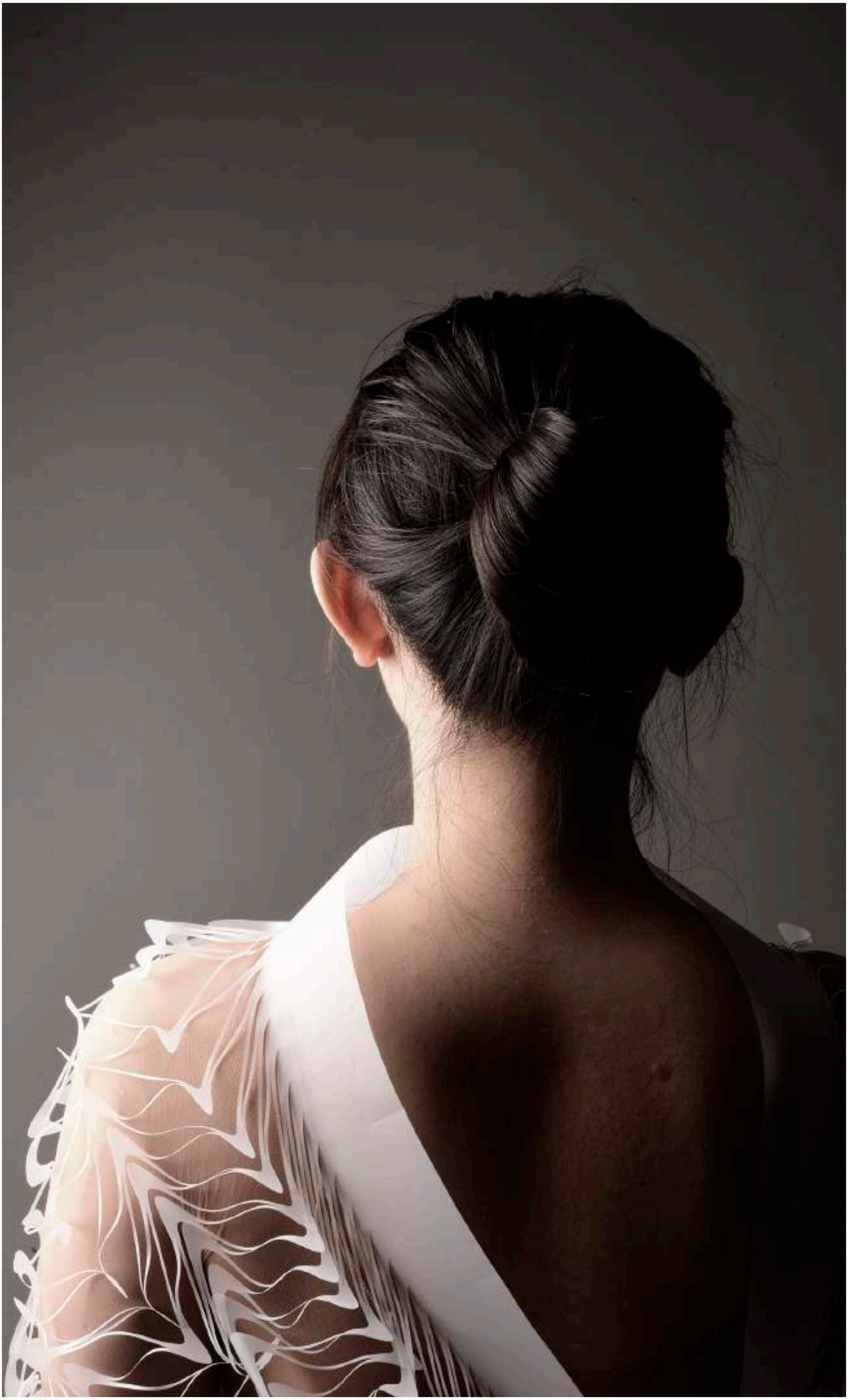
Surface #2
pattern of 75° curved lines, polyester 0.1 mm, 40 x 300 cm

right

Surface #1
pattern of 75° curved lines, polypropylene 0.35 mm, 67 x 150 cm



both
Surface #1
(resonance)

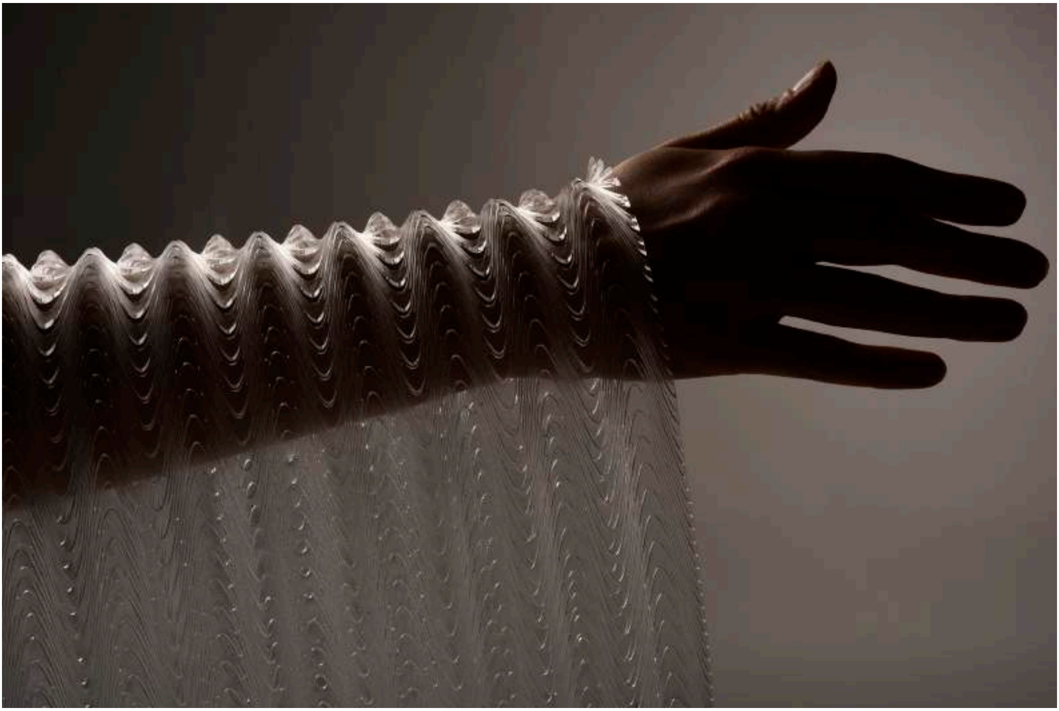


left and top right

Surface #2
(resonance)

rechts unten

Surface #3
(resonance)



PICTURE CREDITS

INSPIRATION

MOODBOARD (f.l.t.r.):

UNKNOWN. Quelle: fffound.com

JAPANESE YUKATA COTTON FABRIC – INDIGO SHIBORI WAVES. Quelle: etsy.com (bearbeitet)

OCEAN WATER BACKGROUND TUMBRL Quelle: pinitgallery.com

Untitled. Author: JULIAN STANCZACK. Quelle: mondo_blogo.blogspot.com

ILLUSTRATION

DAFNA STOILKOVA

IDEOGRAM

DAFNA STOILKOVA

LITERATURE

Abboud, Sami; Amedi, Amir; Arbel, Roni; Levy-Tzedek, Shelly; Maidenbaum, Shachar; Novick, Itai and Vaadia, Eilon. CROSS-SENSORY TRANSFER OF SENSORY-MOTOR INFORMATION: VISUOMOTOR LEARNING AFFECTS PERFORMANCE ON AN AUDIOMOTOR TASK, USING SENSORY-SUBSTITUTION. Nature. Web. Dezember 10, 2012.

Alben, Silas. SIMULATING THE DYNAMICS OF FLEXIBLE BODIES AND VORTEX SHEETS. Journal of Computational Physics. Web. 2009

Anzieu, Didier. DAS HAUT-ICH. Frankfurt am Main: Suhrkamp Verlag. 1992. ISBN-10: 3518288555

Boyle, Rebecca. THE FUTURE OF SKIN. STRETCHABLE ELECTRONICS AND SMART TATTOOS GIVE HUMAN SKIN AN UPGRADE FROM THE FUTURE. Popular Science. Web. September 14, 2011

Evanston, Unbekannt. CONFLICT BETWEEN THE MIND AND BODY HELPS PEOPLE THINK OUTSIDE THE BOX. PRNews-Wire. Web. June 6, 2011.

Fleischer, Hilary. Optical Analysis of a Flowing Soap Film. Stony Brook Laser Teaching Center. Web. 2002.

Hara, Kenya. 2007. DESIGNING DESIGN. Switzerland: Lars Müller Publishers. 2007. ISBN 978-3-03778-105-0.

Hinte, Ed van. Material World. INNOVATIVE STRUCTURES AND FINISHES FOR INTERIOR. Basel: Birkhäuser. ISBN-13: 978-3764367459

Hirsinger, Quentin; Ternaux, Elodie. MATERIAL WORLD 2. INNOVATIVE MATERIALS FOR ARCHITECTURE AND DESIGN. Amsterdam: Frame Publishers. 2006. ISBN-13 978-3-7643-7279-8

Klooster, Thorste. Smart Surfaces. INTELLIGENTE OBERFLÄCHEN UND IHRE ANWENDUNG FÜR ARCHITEKTUR UND DESIGN. P. 87 – 104. Basel: Birkhäuser. 2009. ISBN 978-3-7643-8811-9

Lowrance, David. THE HENDERSHOT PROJECT. Resonans Fractals. Web. 2013.

Nicolis, C.; Nicolis, G. NONLINEAR DYNAMIC SYSTEMS IN THE GEOSCIENCES. USA: Kansas Geological Survey, Bulletin 233, p. 33-42. Web. 1991.

Peters, Sascha. Material Revolution 2: Neue Nachhaltige und Multifunktionale Materialien für Design und Architektur. Basel: Birkhäuser. 2013. ISBN-13: 978-3038214540

The Editors of Encyclopædia Britannica. ELASTICITY. Encyclopædia Britannica, Inc. Web. 2015.

The Editors of Encyclopædia Britannica. RESONANCE. Encyclopædia Britannica, Inc. Web. 2015.

Vlasto, Tima. GROUND-BREAKING RESEARCH: INCREDIBLE CLOTHING THAT SENSES MOODS AND SOOTHES. Examiner.com. Web. June 8, 2010.

Unknown. CYMATICS AND THE REALITY OF AETHERIC RESONANCE. Aetheroforce. Web.

ZERO. Berlin: Martin-Gropius-Bau. 21.March to 8. June 2015.

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VERONIKA AUMANN

JULIA WOLF

ANDREAS KALLFELZ

PROF. MASAYO AVE

PROF. MARK MIODOWNIK

ANNA GÖRNER

MAXIMILIAN BELLINGHAUSEN

PAULA VAN BRUMMELEN

IDALENA RAPP

STEFAN MARIA ROTHER

BJÖRN BERNT

JIAJIA SONG

FREYA BEYER

MARIA GÜNTHER

CONTACTS

DAFNA STOILKOVA

RESONANCE

PUBLISHER

PROF. DR. ZANE BERZINA

WEISSENSEE SCHOOL OF ART BERLIN

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DAFNA STOILKOVA & ANDREAS KALLFELZ

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