CHEMARTS

SUMMER SCHOOL
2016

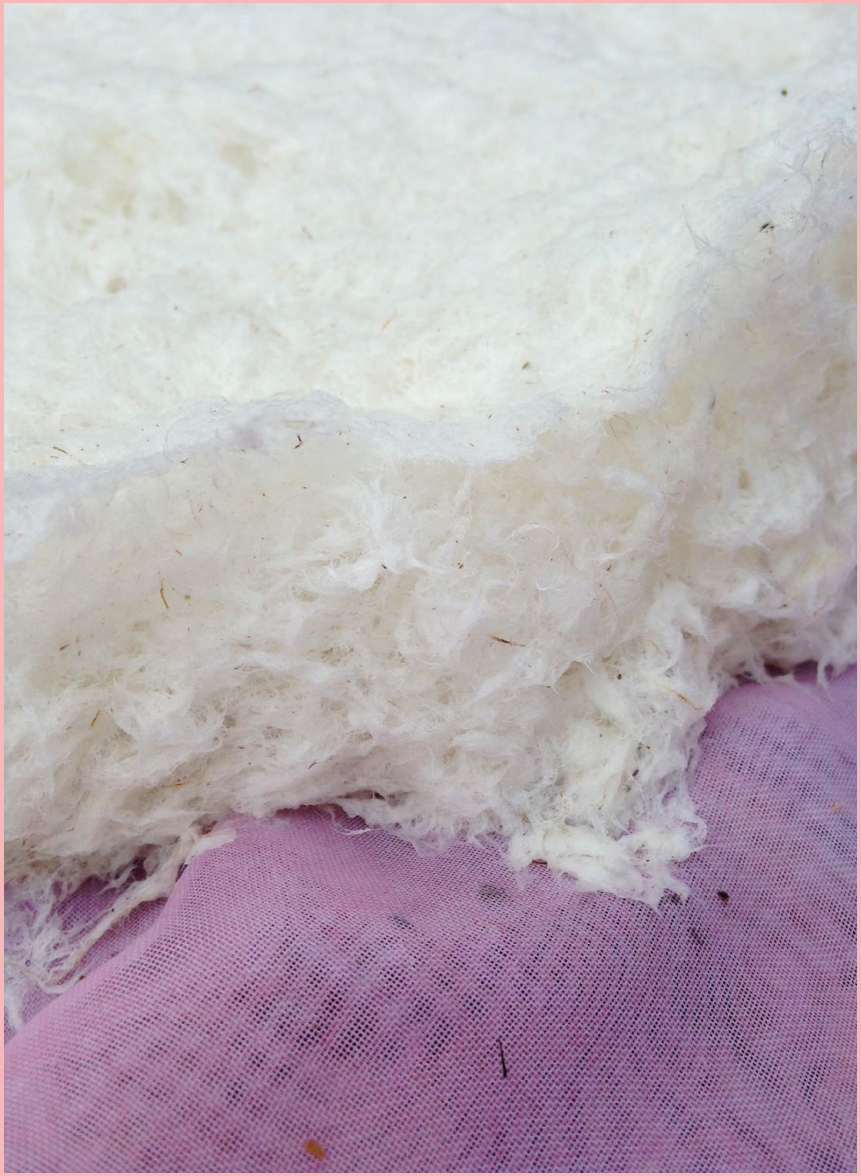
CHEMARTS

CHEMARTS is a long-term collaboration between two Aalto University schools, The School of Chemical Technology (CHEM) and The School of Arts, Design and Architecture (ARTS). The schools merged their forces 2011 with the aim to invent new ways to harness wood and cellulose. The idea is to research the performance and design of advanced cellulosic materials for innovative uses. The main objective is to inspire students and researchers to explore biomaterials together and to create new concepts for the future use of cellulose and other biomaterials.

CHEMARTS consists of various actions, such as multidisciplinary study courses, minor studies starting 2016 and externally funded research projects.

SUMMER SCHOOL
2016

PRINT Picaset Oy



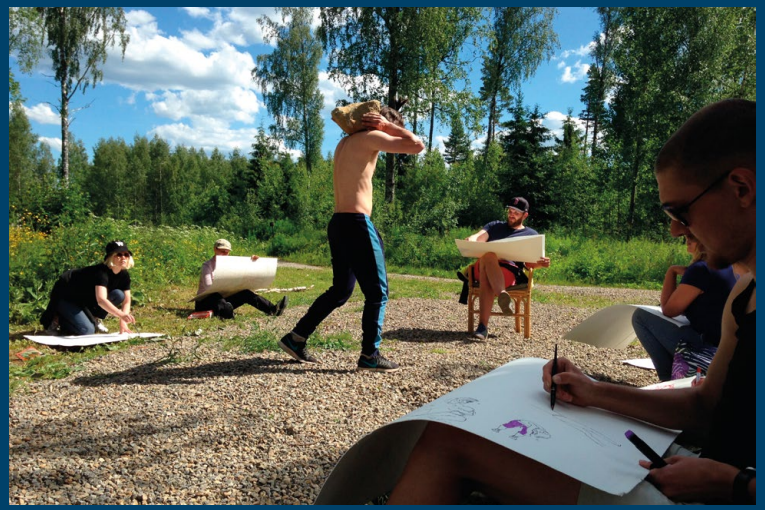
WORKSHOP

The 5th CHEMARTS summer school kicked off with the traditional introductory lectures followed by an intensive four-day workshop by the beautiful Finnish nature at the Camp Finlake in Kuohijoki, Finland. At the camp students shared each other their initial project ideas for the summer, participated in art workshops & experimented with a variety of different techniques ranging from traditional papermaking to the newly developed technology of foam forming. In addition various installation concepts, to be used later on in the summer, were created by the CHEMARTS students. After the workshop the students started working on their individual biomaterial projects for the summer at Aalto's Otaniemi and Arabia campuses.

The final student projects presented on the following pages explore different materials of wood-based and/or bacterial cellulose origin and the different processes of working with these materials. Other interesting topics in the final student projects included Finnish craft tradition and the recycling of plastics among others.

WORKSHOP INSTALLATION

WORKSHOP EXCURSION AT PRO PUU / LAHTI, FINLAND



NATURAL DYES
CROQUIS TECHNIQUE

CHEMARTS
AT KAUPPATORI2017

In August the CHEMARTS students got an amazing opportunity to present their works-in-progress to the public at the Helsinki Market Square in the new Salutmarket stand as a part of the Kauppatori2017 project.

kauppatori2017.aalto.fi

HELENA MANNER, MATILDA TUURE, TINO KOPONEN

MATILDA TUURE, NINA RIUTTA

SAMI MARKKULA

KESTOLEVY - A DURABLE THERMOFORMABLE BIOCOMPOSITE BOARD

Kestolevy is a wood-plastic composite made of post-consumer plastic waste and up to 75% wood flour made of recycled wood. Because the board can be thermoformed, molds are cheap to use and produce. Kestolevy endures water and moist environments, does not need to be coated or taken care of. The wood content makes the board warm to the touch. As such it can be used to make low maintenance furniture. Kestolevy can be used to make double curved surfaces, in contrast to for example plywood. The used Kestolevy can be recycled to new Kestolevy or burned to energy.

AALTO UNIVERSITY, DESIGN
sami.markkula@aalto.fi

BIOCOMPOSITE SAMPLES

BACTERIAL CELLULOSE

MATILDA TUURE

SENSE-ITIVE APPROACH

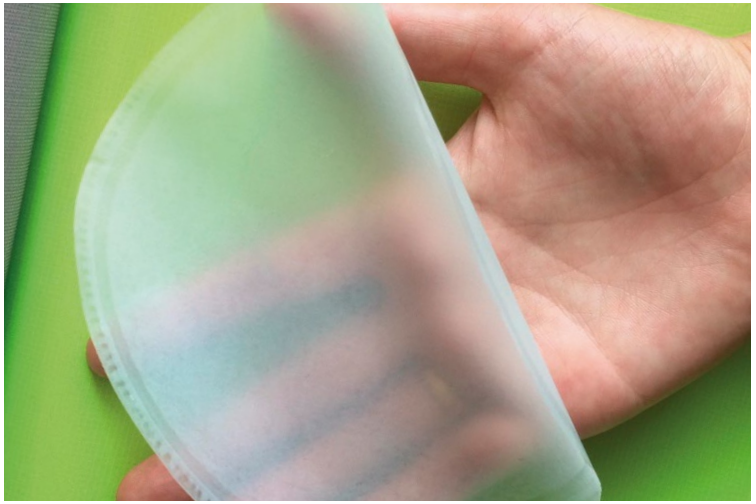
Could future materials have natural senses and reactions?

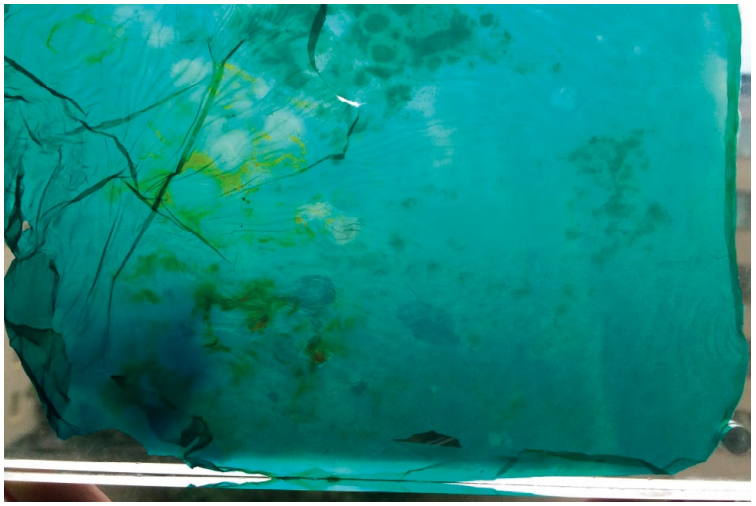
SENSE-ITIVE approach is a project about naturally smart biomaterials and the relationship between materials and human body. My aim is to develop functional and responsive wearable “smart” fabrics that could be more human, without the need to add any electronics or sensors next to our bodies. I wanted to learn about the sensitive features that biomaterials naturally have and find ways to use them as functional properties in technical textiles. I focused on the humidity responsive features of cellulose based biomaterials and bacterial cellulose. The research will continue in collaboration with the Department of Applied Physics and next we will study how to attach these materials on fabrics.

The capability to grow by itself is also one of the most interesting smart feature of bacterial cellulose and kombucha have. It opens my mind for interesting opportunities of grow-it-yourself- items and other possibilities that there could be. Would it be possible to manipulate the DNA of bacteria to add wanted features into material?

While working with new materials it is very important for me to study the character of the material before thinking of a design. Durign the growing stage and coloring I didn't know how the bacterial cellulose was going to turn out so I tested it a lot.

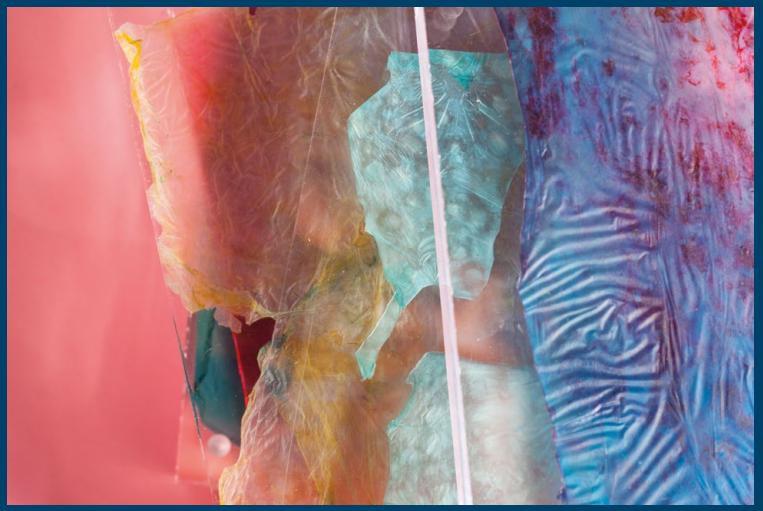
AALTO UNIVERSITY,
FASHION AND COLLECTION DESIGN
matilda.tuure@aalto.fi





HUMIDITY SENSITIVE NANOCELLULOSE FILM
BACTERIAL CELLULOSE

DYED BACTERIAL CELLULOSE



BACTERIAL CELLULOSE SAMPLES

LUMINAIRE FROM CELLULOSE TRIACETATE

NINA RIUTTA

CELLULOSE IN MOTION

A LIGHT FIXTURE INSPIRED BY MOVEMENT

The luminaire is made from environmentally friendly cellulose - cellulose triacetate. The organic matter, cellulose triacetate (CTA) is transparent, can be bent and holds water. A luminaire that is produced from cellulose supports the concept of organic materials substituting plastics in the future.

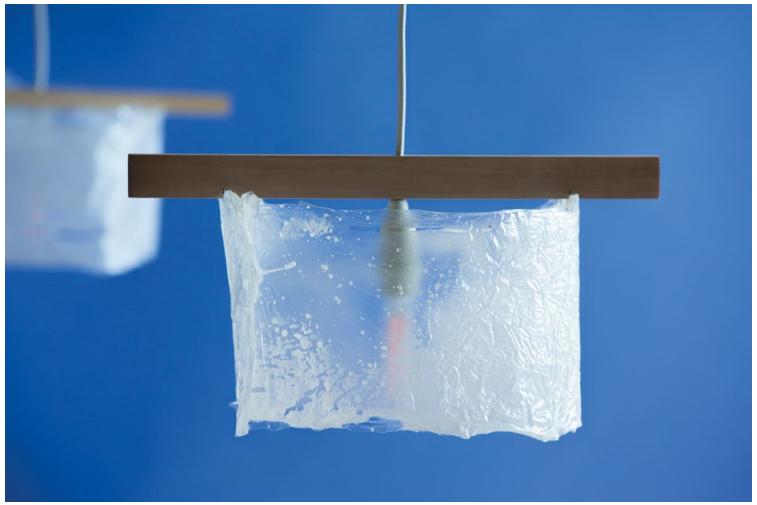
Each light fixture is unique and comes with patterns that can be found in the nature. The technique is based on the centrifugal force of rotation.

100% WOOD

The shade of the luminaire is produced from CTA and the frame is made from finnish aspen. The aspen frame's design is minimalistic to draw attention to the shade.

The cellulose triacetate as a thin layer is translucent and passes light through beautifully.

AALTO UNIVERSITY, DESIGN
nina.riutta@aalto.fi
n.riutta@gmail.com



CELLULOSE TRIACETATE SAMPLE

CELLULOSE TRIACETATE SAMPLES

BIOMATERIAL SAMPLES

HELENA MANNER

GLUCONACETOBACTER XYLINUS

The works that I exhibited are mostly colour and material samples from the summer. While working with the biomaterials for the first time the process itself was more important to me than the actual outcome. I always highlight that the presence of the process has big value in my work. I was interested in the technological part and the techniques I could use to create my works. Most of the samples are made from bacterial cellulose. I am always fascinated by a certain kind of uncontrollable outcome but I tried to maintain the sensitivity of this material. Colours are always important for me, when designing objects therefore I always pick their colors carefully. In these, I wanted to pick the colors which has emotional meaning for me. That's why I picked blue, red, lilac and other colors what I find beautiful. I was interested in the process and techniques I could use to create my final samples.

WHY I CHOSE BACTERIAL CELLULOSE/KOMBUCHA?

A kombucha culture is a symbiotic culture of bacteria and yeast (SCOBY). When dried, culture becomes a leather-like textile known as a microbial cellulose that can be molded onto forms to create seamless clothing. The kombucha textile is bacterial cellulose whitch is sustainable and compostable.

ESTONIAN ACADEMY OF ARTS,
GLASS ART AND DESIGN
helenamaria.manner@artun.ee

BACTERIAL CELLULOSE

DYED BACTERIAL CELLULOSE DETAIL

BACTERIAL CELLULOSE DETAIL

TINO KOPONEN

GROWTH VISIONS

Since I'm into microbiology and biotechnology, chemartsing with microbes was a no-brainer for me. Kombucha, the SCOBY of cellulose-producing bacteria and yeast, was a natural starting point for my summer because it combines my beloved microbes with our theme cellulose. Although kombucha tea itself is interesting as an age-old traditional beverage, as a top-notch scientist I did not want to limit my work on just making tea. Thus I isolated the cellulose-producing bacteria from kombucha and cultivated them in a benchtop bioreactor. Based on the laboratory work observations I envisioned three different concepts – Tubes, Haven and Foam, for growing bacterial cellulose. These concepts could be used produce yarn, spherical objects or 3D shapes.

AALTO UNIVERSITY,
BIOTECHNOLOGY
tino.koponen@aalto.fi

BACTERIAL CELLULOSE

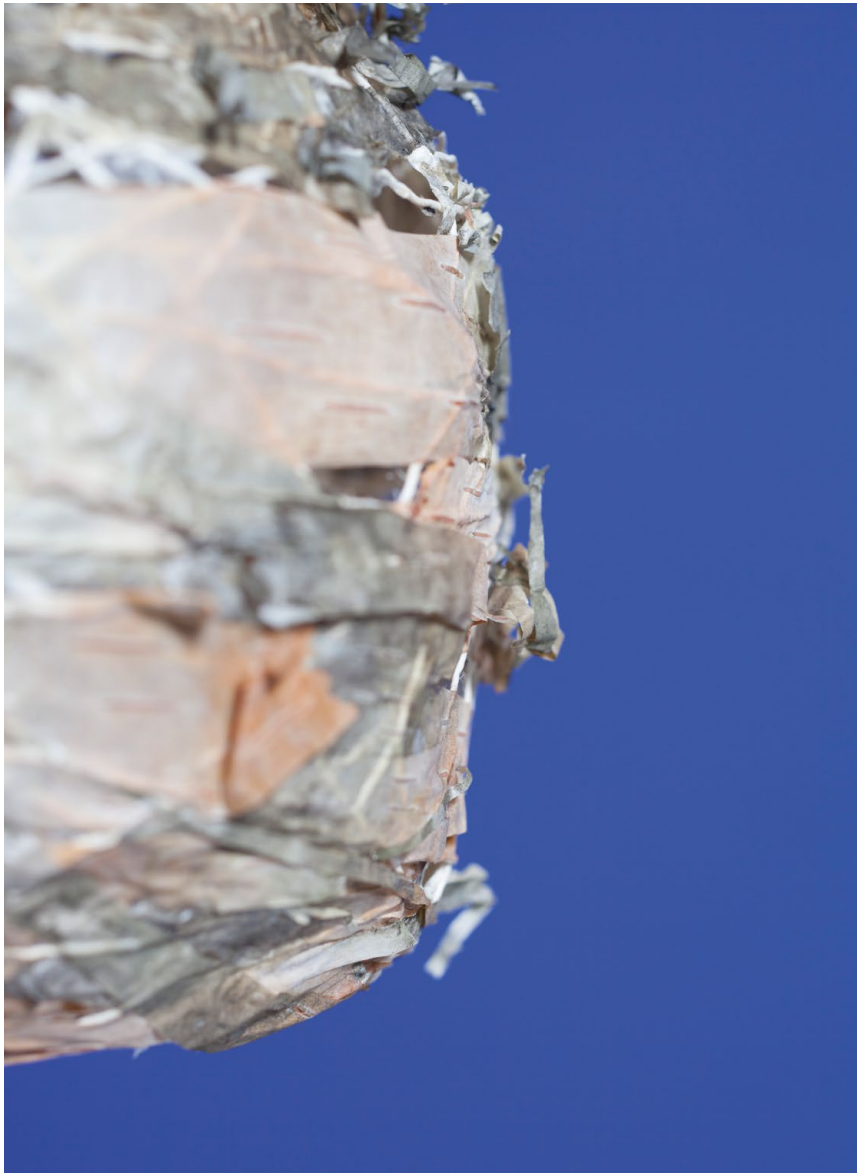
BACTERIAL CELLULOSE

KATJA UTRIAINEN

BIO SHADE

Bio Shade is a biodegradable lampshade made from paper yarn and different kinds of biomaterials. Altogether, there are eight prototypes that consist of different combinations of cellulose, nanocellulose and carboxymethylcellulose (CMC). Prototypes are dyed with natural dyes such as nettle, willow and lignin. I was inspired by Finnish nature and I tried to capture its beauty in a lampshade. Bio Shade creates the feeling of a forest with its shadow. Two of them are even coated with birch bark. The project evolved from material testing to a colourful range of lampshades.

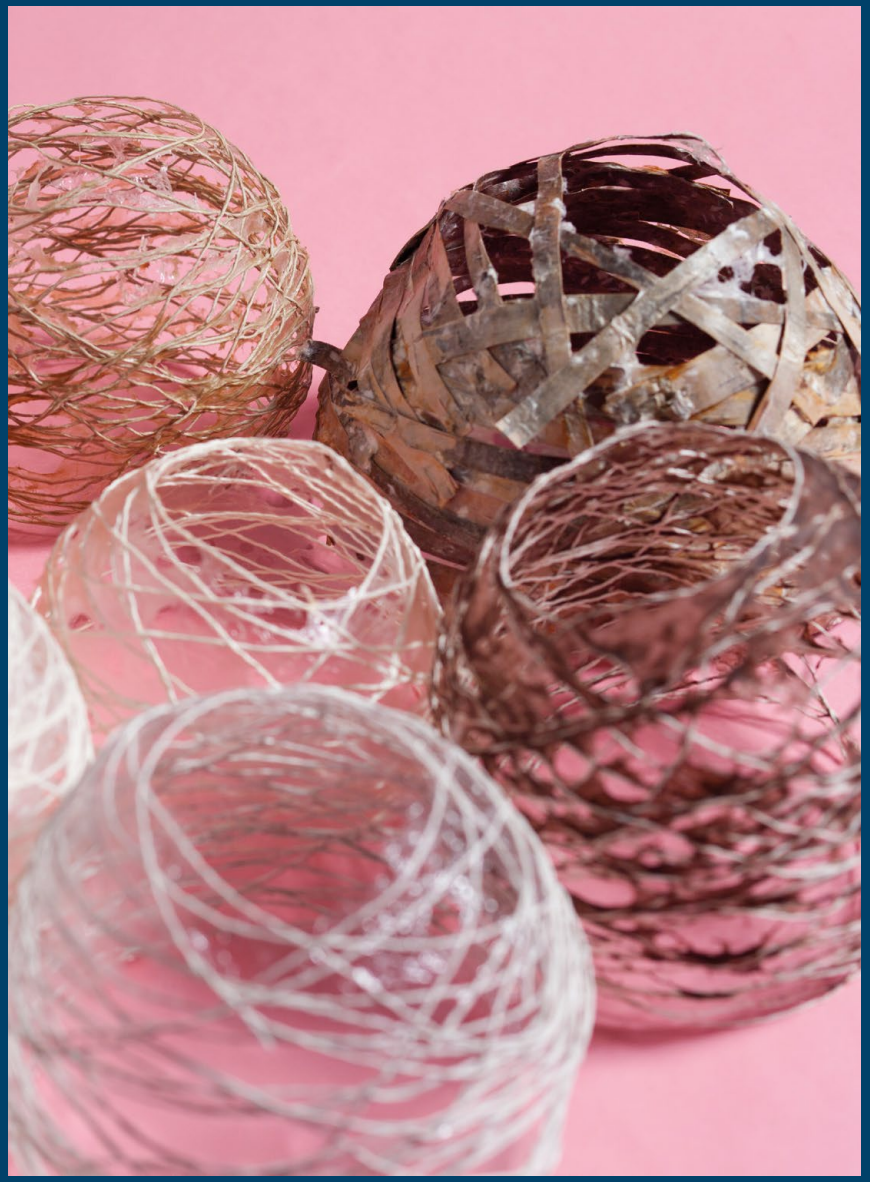
AALTO UNIVERSITY,
FIBRE AND POLYMER ENGINEERING
katja.utriainen@aalto.fi



BIRCH BARK DETAIL

DYED NANOCELLOSE AND PAPER YARN

NANOCELLOLOSE DETAIL



BIODEGRADABLE LAMPSHADES FROM CELLULOSE

NOORA SANDGREN

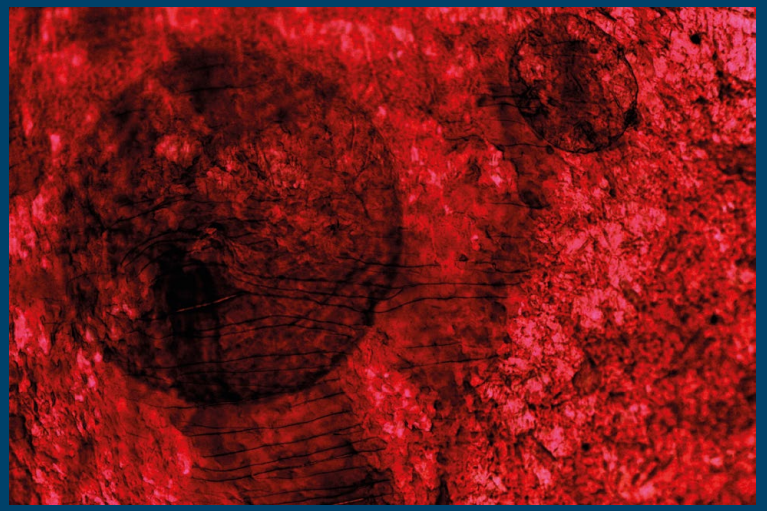
COSMOS

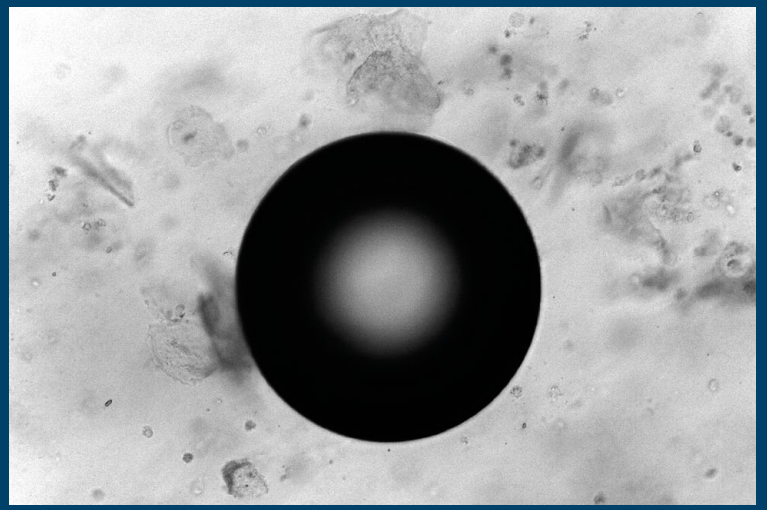
The base of my research is in widening my vision. Experimenting with optical utilities of laboratory – microscope camera, allowed me to study the aesthetics of landscapes shaped by nanocellulose film and air patterns of my saliva. Inspired by the living aspects of bioart, I use abstraction as method in keeping an image alive. Its interesting how the distance between micro and macro cosmos is lost; how microscopic imagery could mix with space imagery.

Humboldt* examined nature as both physically visible "ordered" universe and as "adored/beautiful" referring to contemplative attitude and human interpretation. In my work I reflect similar ways of seeing and perceiving.

*Cosmos: A sketch of a physical description of the universe.
Von Humboldt, Alexander. New York, Harper & Brothers,1866

AALTO UNIVERSITY,
PHOTOGRAPHY, ART EDUCATION
noora.sandgren@gmail.com





COSMOS (NANOCELLULOSE)
COSMOS (SALIVA)

BACTERIAL CELLULOSE LAMP SHADES

MONIKA FAIDI

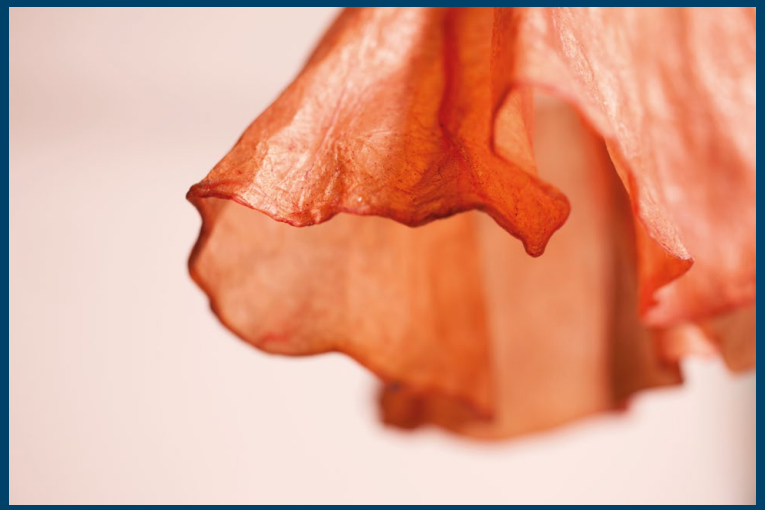
GROW YOUR OWN LAMP!

My design process usually starts from material. This time instead of buying it, I grew the kombucha leather in my kitchen. The static growth process took 8 weeks. I am fascinated by the concept of growing a sustainable material from just sweetened tea and starter culture. You can grow only as much as you need and do not produce any waste. Recycling is not problematic because bacterial cellulose is biodegradable material.

The lamps resemble flowers and I am satisfied with the final prototype. In the future I would like to explore the variety possibilities of using cellulose in furniture design.

AALTO UNIVERSITY,
INTERIOR ARCHITECTURE
monika.faidi@me.com

BACTERIAL CELLULOSE LAMP SHADES



KOMBUCHA SCOBY / BACTERIAL CELLULOSE DETAILS

GROW YOUR OWN LAMP!

MONIKA FAIDI, SANNI HONKANEN, SUVI KYYRÖ

DESIGN ROOTS

Design Roots is an installation inspired by the Finnish craft traditions. During the project we studied natural dyes and traditional twining/ weaving methods; the piece was built with recycled fabrics and dyed with plants collected from the nature.

As the themes of traditional crafts pieces were usually drawn from the surrounding world of the time, we decided to picture our own milieu: Helsinki 2016. Some of the themes include transportation, common animals, modern hobbies, or familiar symbols.

AALTO UNIVERSITY,
SCHOOL OF ARTS, DESIGN AND ARCHITECTURE,
SCHOOL OF BIOTECHNOLOGY AND CHEMICAL TECHNOLOGY

SANNI HONKANEN, MONIKA FAIDI

SUVI KYYRÖ

NATURAL COLOURS

As a part of the Design Roots project a variety of resources from nature were utilized in order to recolour recycled textiles. The primary goal was to produce many different colours to use in the final installation art piece which combines traditional textile technique with modern motif. The secondary goal was to investigate the effect of different pHs and mordant quantities on colours. Different natural sources were chosen based on their abundance in nature and usability as a dye. Sources included for example tansies, onion skins, nettles, chokeberries and common madder. Potassium alum was utilized as a mordant. The colour palette was further expanded by changing pH, amount of mordant and processing time.

AALTO UNIVERSITY, BIOTECHNOLOGY
AND CHEMICAL TECHNOLOGY
SUVI.KYYRO@AALTO.FI

SUVI KYYRÖ

NATURAL COLOUR SHADES
INSTALLATION: WORK IN PROGRESS

CHEMARTS 2016

BACK: TINO KOPONEN, SUVI KYYRÖ, MONIKA FAIDI, KATJA UTRIAINEN
MIDDLE: NINA RIUTTA, SAMI MARKKULA, HELENA MANNER,
SANNI HONKANEN, MATILDA TUURE
FRONT: ANDREAS LINDBERG

SUMMER SCHOOL
2016

CHEMARTS

STAFF 2016

Tiina Härkäsalmi

Pirjo Kääriäinen

Andreas Lindberg

Carlos Peralta

Liisa Tervinen

Tapani Vuorinen

PHOTO CREDIT

Eeva Suorlahti	Cover photo, 14, 16, 18, 22, 23, 24, 27, 28, 36, 38, 39, 40, 42, 43, 44, 45, 48, 50, 51, 53, 54, 56, 57, 58
Nina Riutta	4, 7, 8, 9, 12, 28, 34, 28, 35
Noora Sandgren	47
Liisa Tervinen	10
Matilda Tuure	21

LAYOUT Nina Riutta

CHEMARTS
chemarts.aalto.fi
Aalto University
www.aalto.fi