MATERIAL Legacies

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DESIGN LAB #13
KUNSTGEWERBEMUSEUM BERLIN

Matters of Activity. Image Space Material. Humboldt-Universität zu Berlin

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MATERIAL LEGACIES

CLAUDIA MAREIS I CO-DIRECTOR MATTERS OF ACTIVITY

Anthropogenic climate change has made it clear that, among other things, we need new ways of dealing with materials, that is, a new material culture. How can we make better use of waste and leftover materials? What can we learn from biological processes when considering material processing? What do materials and artifacts teach us about our relationship to the environment or history? Design Lab #13: Material Legacies at Kunstgewerbemuseum Berlin explores these questions by relating experimental approaches to materials research, design, technology, and architecture with traditional crafts and objects from the museum's collection. The exhibition results from a close collaboration between the museum and design researchers from the Cluster of Excellence "Matters of Activity. Image Space Material" at Humboldt-Universität zu Berlin. In this interdisciplinary network, researchers from more than forty disciplines in the humanities, natural sciences, design, and architecture explore how a new material culture can be fostered by understanding active material structures and properties.

However, the ambition of fostering a new material culture cannot be limited to a biomimetic approach or a technological rationale if it is to address the massive ecological and societal challenges we face today. Rather, there are also entangled societal, political, and historical dimensions of active materiality that need to be explored in order to understand how worlds are imagined, produced, and destroyed alongside materials and material politics. In this context, materials are the starting point and driver of complex historical developments and dead ends, including bio- and geopolitical struggles and unexpected resistances. Last but not least, materials also tell of futures: not only of futures lost to extraction and consumption, but perhaps of alternative futures that are more sustainable, diverse, careful, and solidary than what we experience and expect today, through a different understanding of materials, their potentials, and legacies.

Material Legacies is, thus, above all, a programmatic perspective that asks by example about the historical, present, and future conditions under which materiality unfolds. By engaging with a range of different materials, artifacts, and techniques, the exhibition encompasses both the problematization of unsustainable pasts and presences and the imagining of speculative material futures. Starting from materials such as sand, water, rubber, seashells, or plant-fibers, each exhibit explores its sociocultural, economic, and political context to unravel the multiple interrelationships that arise from and with material potentials and legacies.

For materials and materiality are not simply given by "nature", but instead they are always in the process of defining, transforming, and becoming: Through various techniques of categorization, scaling, valorization, extraction, and design, materials might become either natural resources, raw materials, industrial commodities, cultural symbols, or useless waste. To take the example of materials-as-resources: "Resources come to exist both through technical invention and physical production, as well as through acts of epistemological and ontological creativity". Anthropologists Tanya Richardson and Gisa Weszkalnys go on to explain: "Resource making has been conceived as a process of turning nature into culture par excellence."[1] However, it would be misleading to conceive of materials merely as passive entities that can be cultivated, shaped, exploited, and controlled at will. Instead, they possess vibrant qualities, that is, material activity, stubbornness, and resistance that make them uncontrollable agents of the scientific, economic, and sociopolitical structures and processes in which they are involved. It is thus a

matter of "the uses and possibilities that matter affords to us – what may be referred to as material agency or potentiality". [2]

Moreover, as Anna Tsing has argued, materials create resistance and friction by both enabling and resisting mechanisms of their control and exploitation: "Consider rubber. Coerced out of indigenous Americans, rubber was stolen and planted around the world by peasants and plantations, mimicked and displaced by chemists and fashioned with or without unions into tires and, eventually, marketed for the latest craze in sports utility vehicles. [...] Industrial rubber is made possible by the savagery of European conquest, the competitive passions of colonial botany, the resistance strategies of peasants, the confusion of war and technoscience, the struggle over industrial goals and hierarchies, and much more that would not be evident from a teleology of industrial progress. It is these vicissitudes that I am calling friction. Friction makes global connection powerful and effective. Meanwhile, without even trying, friction gets in the way of the smooth operation of global power. Difference can disrupt, causing everyday malfunctions as well as unexpected cataclysms. Friction refuses the lie that global power operates as a well-oiled machine."[3]

In this sense, materials are never either natural or artificial. Rather, materiality emerges in the fusion of nature and culture dichotomies, past memories, and speculative futures. Accordingly, the material legacies that this exhibition attempts to tell are stories of inextricable entanglements and traces of potentiality and friction.

[1] Richardson, Tanya, and Gisa Weszkalnys. 'Introduction: Resource Materialities'. *Anthropological Quarterly* 87, no. 1 (2014): 12.
[2] Ibid., 15.
[3] Tsing, Anna Lowenhaupt. *Friction: An Ethnography of Global Connection*. Princeton: Princeton University Press, 2004, 6.

ARTS AND CRAFTS MUSEUMS AS MATERIAL ARCHIVES

CLAUDIA BANZ I CURATOR OF DESIGN AT KUNSTGEWERBEMUSEUM BERLIN

Materials innovation has a strong potential for transforming society and the environment, both positively and negatively, if researchers consistently push the boundaries of what is feasible. Materials research can enable new generations of products, open new living environments and thus bring about unique social, economic, ecological, and cultural interactions.

The splendor and wealth displayed by the "Wunderkammern" (cabinets of curiosities) of the Renaissance and the Baroque ages show how closely power, politics, and status are related to the representation of materials. Materials often stemmed (and still do) from foreign and predominantly colonial contexts that processed extracted goods into jewelry and other luxury objects. Opened in 1724, the Green Vault in Dresden, the treasury of Augustus the Strong, is one of the most prominent examples. Its eight rooms are named after materials such as the Amber Room, Ivory Room, White Silver Room, etc., and were instantly open to the public.

Founded in 1867, Kunstgewerbemuseum Berlin (Berlin Museum of Decorative Arts) is Germany's

oldest of its kind. It received collections from the Royal Chamber of Art, founded in 1603, whose holdings were distributed to the Berlin museums in 1875. These once "royal" objects included "exotic" materials such as coral, mother-of-pearl, ostrich eggs, ivory, or the nautilus shell and were intermingled with other objects acquired from private collections. However, the most important source of new acquisitions were the world exhibitions which presented, among many other things, handicrafts and designs from contemporary production. In this period, the focus of the collection shifted to materials that were economically relevant in the respective local industries, such as metal, wood, glass, ceramics, and textiles.

Over the past 150 years and due to their specific collection spectrum, decorative arts museums have grown into complex material archives. Their particular strategy of ordering, showing, and representing continues to be closely linked to the founding idea of the collection. The classification of objects by genre, geographical origin, and material intends to build a cross-epochal collection of models with well-designed products that include times of industrialization, the beginning of mass production, and the loss of quality of products.

Arts and crafts museums have always been viewed as alternative places of learning. A school of arts and crafts was often located under the same roof as these museums to promote active exchange between students and museum colleagues, facilitating access to the exhibits in the collection. The archive system known as "role model folders" was a forerunner of contemporary image databases that helped expand the museum's capabilities as a learning institution.

Through their collections, arts and crafts museums represent a colossal knowledge repository concerning materials, handicraft techniques, and tools. These abundant and centralized resources can thus offer enormous potential for designers, artists, and material researchers. Understandably, in times of global crises, the focus needs to be not only on developing more sustainable design practices and the rediscovery and revitalization of historical approaches but also concerns the renaissance of the haptic, the sensual quality of the tangible in the digital age.

It is precisely at this interface that our Design Labs are located. Design Lab is conceived as a series of collaborative projects that materialize in research, discourse, exhibition, and mediation formats. It invites outside actors to engage with the museum's complex collection to tap into their artistic research and connect, update and expand the archive as a repository of knowledge. After all, materials will continue to structure our society in political, economic, ecological, social, and cultural terms and the museum will continue to inspire new generations of thinkers and makers.

RUBBER VIOLENCE

CLAUDIA MAREIS, HELEN PINTO, EMILE DE VISSCHER, AMANDA WINBERG

"The audio evokes a reflection on how indigenous knowledge has been expropriated and commodified for the purposes of Western consumer culture in the past, and on how this violence act extends up to the present."

Rubber Violence consists of several pieces of raw rubber and an audio track that takes us on a critical investigation into the violent history of rubber and design.

The chunks of rubber are compact, bouncy and emit a heavy odor. With their ambiguous shape, almost flesh-like texture and gory colour, they invite the viewer to think about corporeality, force, and violence embedded in the history of rubber. The concentrated work of bodies and people can be sensed in its compressed appearance, while the separated parcels, in their industrial shape, recalls the dehistoricization of materials within Western colonial and industrial practices.

To the sight of the rubber chunks, the audio track provides a historical context. A voice describes how the rubber industry, during the 19th century, changed everything from Western consumption to transportation systems, while recalling the industry's colonial and reductive view of the Meso- and South American peoples and their long standing knowledge of working with rubber.

The audio takes us back to the 1851's Great Exhibition in London, where vulcanized rubber was prominently displayed. Meant to function like a "lesson in taste", the Exhibition showed raw materials next to agricultural machinery, technical instruments, porcelain, textiles, stuffed animals, weaponry and many more things. With this history in mind, the audio evokes a reflection on how indigenous knowledge has been expropriated and commodified for the purposes of Western consumer culture in the past, and on how this violence act extends up to the present.

The voice takes us further into its investigation by calling into question some deep-seated problems in Design history. A connection between the aim of the World Fairs and the design disciplines' complicity in the rise of material cultures and its modes of subjectivity is suggested. Making two examples of places where commercial interests and cultural standardization intersect, the World Fair and the discipline of Design are identified as two equally symbolic as concretely influential instances of where new orders of global capitalism and its production of knowledge has been developed and achieved.

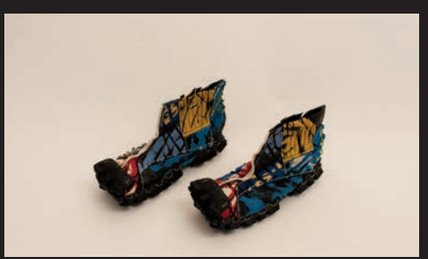
By the time of the Great Exhibition in London, rubber was still cultivated by harvesting wild rubber trees in the Amazon basin. It became attractive for manufacturers, designers and retailers due to its material properties, such as its elasticity and impermeability to water. However, rubber showed itself hard to handle for the European manufacturers. While the idea of the rubber as an empty, abstract and passive material, stripped of qualities, histories and connections to particular territories, people and knowledges, gave rise to the expectations that the material could easily be handled and shaped in any desired fashion, the rubber was in fact hard to control and responded actively to its immediate surrounding.

Due to its active thermoplastic properties, the rubber changes consistency depending on the external temperature. As the European manufacturers lacked this knowledge, the rubber often behaved in unpleasant and uncontrollable ways: it became sticky or leaking, started to stink or rot in the warehouses. The voice suggests that we could learn something from this story about how dehistoricized "raw" materials and "naturalized" resources, such as rubber, has been utilized within the prospects of colonialism, slavery and their racist legitimization.

The rubber that was ordered for the exhibition, Material Legacies, was produced and distributed by the global trading company Corrie MacColl, a subsidiary of Deutsche Bank. While Corrie MacColl promises a sustainable and socially responsible mode of production at their plantations in Cameroon and Malaysia, we must not forget that the company is entangled in a larger capitalist system, responsible for violent orders of power and a violent logic of extractivism and consumption, intact since colonial times.

Rubber Violence, 2022. Claudia Mareis, Helen Pinto, Emile De Visscher, Amanda Winberg. Photo: Amanda Winberg.

Corresponding object from the collection



Nabukenya Allen, aka Njola, is a Ugandan multimedia artist, founder of NJOLA Impressions and co-founder of Compose Collection. She works with recycled industrial waste and advocates community-based design practices.

Njola's design process begins with the collecting of discarded tires, plastic bags and sandals in places where poor waste management has led to toxic and, at times, dangerous living conditions, primarily in the slums of Kampala. Using the skills she learned from her mother, who worked as a traditional palm mat weaver, she finds beauty and potential in the undervalued and misunderstood. In this way, waste is given new life through the method of upcycling.

To make the shoes, a piece of a tire's profile has been cut off using a knife and joined with the repurposed soles of old flipflops. She describes that, faced with the initial problem of not being able to afford real leather while at the same time noticing the abundance of discarded material in the slum area near her family home, she naturally turned to different practices of upcycling.

NJOLA Impressions.
Shoes and Bag, 2019. [Germ. title: Schuhe und Tasche, 2019.]
Rubber, recycled car tyres and flip flops.
Provenance: Purchased from the designer.
Inv. no.: JLG 2020.2

ARCHITECTURAL YARNS

IVA REŠETAR, CHRISTIANE SAUER, MAXIE SCHNEIDER, JOSEPHINE SHONE

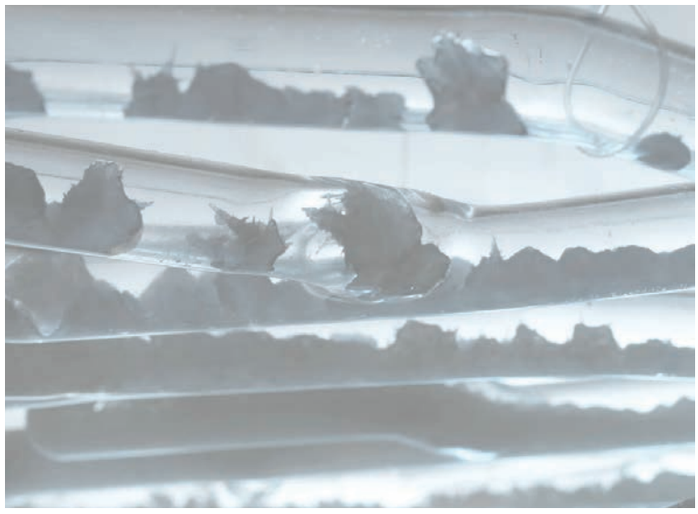
Tangled Wall made from flax fibers. Assembling the Tangled Wall is a tactile practice of crossing and knotting yarns to shape the formless bulk into a textile structure. To guide this process, the pattern for making the wall is embedded in the structure of the yarn: the transitions from thin to thick are the annotations for interlacing. Iva Rešetar, Christiane Sauer, Maxie Schneider, Josephine Shone. Photo: Michelle Mantel © Matters of Activity, 2022.

"As an alternative form of design and making that is distinctly modern in the field of textile art, textiles are explored here as a path of environmental regeneration and repair within conflicting legacies of modernism in architecture."

Architectural Yarns negotiate between the scales of textiles and architecture and the different timescales and life cycles of building elements. As a design intervention into the existing built space, in contrast to solid construction, they are less concerned with permanence and more with adaptation and flexibility of use.

Yarns show the possibility of building differently – with thermally active phase change materials or with plant fibers. Various textile techniques are explored in this experiment to create soft, provisional architectures. Through the tactile practice of making, yarns are formed into a structure with many possible arrangements, only to be unraveled again later. Such bodily engagement with the textiles conveys a "tangible thinking," similar to how Jessica Güsken pictures handcraft techniques of tapestries and carpets, particularly the concept and practice of knotting.[1] This technique, Güsken notes, does not merely provide examples. Instead, it serves as a model of "mixed layers and intermingled bodies," in the case of our experiments – a sensual mode of interconnecting plants, things, bodies, and environments, which find their contact surface in fiber, yarn, and the built fabric.

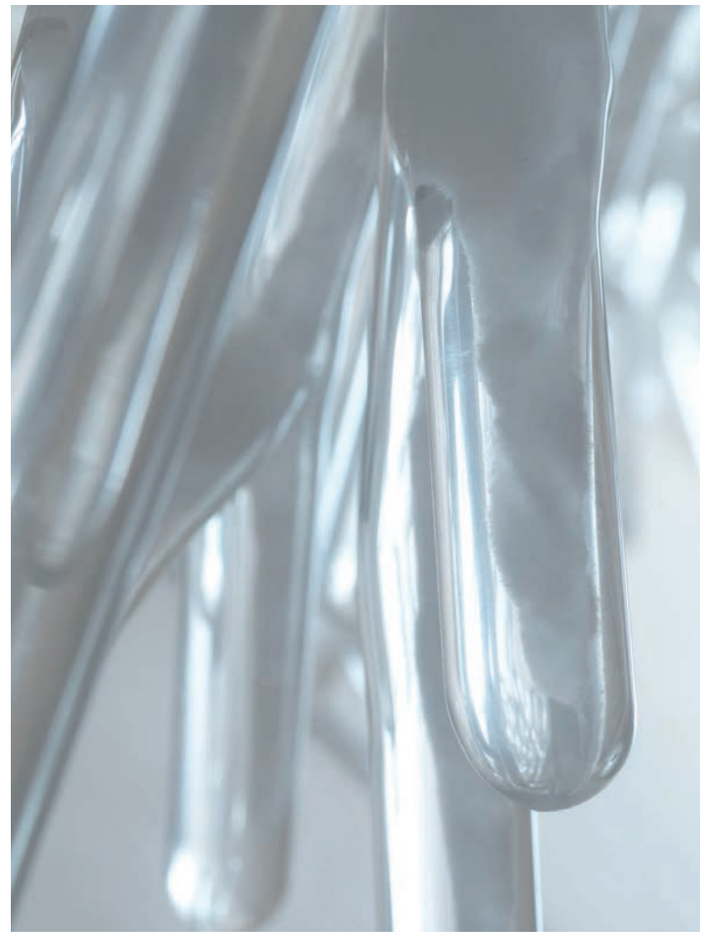
[1] Güsken, Jessica. 2020. 'Knoten: Lösen, Knüpfen, Mit Der Haut Denken. Michel Serres' Tangible Philosophie Der Gemenge Und Gemische.' In *Michel Serres*, edited by Reinhold Clausjürgens and Kurt Röttgers, 37–57. Paderborn: Brill | Fink.



HOW DID THE OBJECT FROM KUNSTGEWERBEMUSEUM COME TO INTEREST YOU?
Tapestry “Exotica III” by Ritzi Jacobi was part of international exhibition “Textile Objects” (Textile Objekte) held at Kunstgewerbemuseum in 1975, which radically questioned historical textile techniques, especially their decorative and gendered aspects, defining an open and critical field of works between sculpture, architecture and textile art. As designers/researchers, we are interested in the turning point when a generation of craftswomen broke with artistic conventions to explore tapestry as a medium for constructing (material) histories and experimenting with its sensorial, performative, and spatial dimensions.

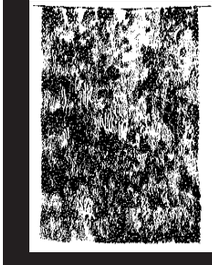
IN WHAT WAY DO YOU SEE CONGENIALITY, SIMILARITIES, CONTINUITIES, OR DISCONTINUITIES BETWEEN THIS OBJECT AND YOUR PROJECT?
Like Architectural Yarns, Jacobi’s work moves in the ambiguous space between plane and three-dimensional space as well as between the scale of textile and architecture. By weaving together unusual combinations of materials – a “mixture” of wool, silk, sisal, goat, and horse hair – “Exotica III” suggests how plant, animal, and human-made materials find their contact surface and coexist in textile environments.

IS IT POSSIBLE TO SPEAK OF MATERIAL CONTINUITIES BETWEEN THE OBJECT AND YOUR PROJECT, THAT IS, OF A HISTORICAL DEVELOPMENT OF OR IN THE MATERIAL YOUR OBJECT CONCERNS? IF YES, HOW COULD THIS DEVELOPMENT OF THE MATERIAL BE DESCRIBED?
Architectural Yarns explores the legacies of different “mixtures” – that is composites, overlaps, intermingled bodies – by making fibrous structures from biological materials. Some resemble industrial plants from Jacobi’s sculpture, such as flax or linen, which are being rediscovered as a building material in today‘s ecological crisis. Other structures further emphasize the temporality of textiles and their climate-modulating qualities, using phase change materials – beeswax and plant fats – to create temporary thermal boundaries in the exhibition space. Jacobi’s work emerged during the period of Modernism and International Style in architecture, known for its standardized materials and indoor climates. This was a moment when textiles productively challenged and contrasted architectural materiality. Tapestries of architectural scale, such as Le Corbusier‘s “Le Mural Nomade” (Muralnomad), clothed and enveloped interiors temporarily in dialogue with often representative, institutional architectures they inhabited. As an alternative form of design and making that is distinctly modern in the field of textile art, textiles are explored here as a path of environmental regeneration and repair within conflicting legacies of modernism in architecture.



Plant-based phase change materials. Through the process of melting and crystallising, these materials exchange energy with the environment, creating temporary thermal boundaries in the exhibition space. Iva Rešetar, Photo: Jens Ziehe, 2019.

Corresponding object from the collection



Being one of the European pioneers of the 1960’s New Tapestry Movement, Ritzi Jacobi played a key role for the international flourishment of thread-based material work in expansive, gestural, and impulsive installations.

In her relief-like tapestries, Jacobi explores the sculptural possibilities of filament, a yarn-like fiber structure usually made out of animal or plant material, by three-dimensionally drawings and the usage of fiber cables and balled coiled threads for effects of light and shadow. With their "shaggy" mass and monumental size, often composed out of goat and camel hair or sheep's wool, Jacobi's works convey a raw physicality reminiscent of her Transylvanian homeland mountains. They suggest reflections on nature, archaic realities, and on the fundamental qualities of conscious and unconscious experiences.

Ritzi Jacobi.
Exotica III, 1975.
Wool, silk, goat and horse hair, sisal in tapestry and mixed techniques.
Provenance: Purchased from the artist.
Inv. no.: 1976,37

THE BARK SPHERE – THE EXPLORATION OF A FORGOTTEN MATERIAL FOR THE DEVELOPMENT OF FUTURE DESIGN APPLICATIONS

JOHANNA HEHEMEYER-CÜRTEN, ROBERT STOCK, CHARLETT WENIG

The bark sphere is made out of mirror pine bark. The bark is peeled in the Brandenburg forrest and flexibilised and woven at the MPI. The image shows the final sphere photographed in the area where the used pine bark was peeled.

Inside the bark sphere. The inner side of bark is a smooth surface which looks like a mix between wood and leather. The smell inside the sphere is reminiscent of forest.▸

Bark, the boundary between trees and their environment, comprises about 10–20% of their total volume. These layers form the interface between the environment, the vital cambium, and wood. What does this protection feel like? Can bark take on protective functions for humans as well? These questions arise when peeling bark off a tree for the first time. The bark sphere installation aims to allow one or more people to stand inside and experience the sensation of being surrounded by the material. The use of tree bark with a woven structure enables the use of the protective function of the bark while also controlling the object's stability through the use of different weaving patterns. The inherently complex round shape of the sphere is meant to explore the limits of formability and leave room for the viewer's interpretation.

Twill weave was used for textile applications made out of bark. First tests showed a better superior and were used for a woven bark jacket.

"The use of tree bark with a woven structure enables the use of the protective function of the bark while also controlling the object's stability through the use of different weaving patterns."

HOW DID THE OBJECT FROM KUNSTGEWERBEMUSEUM COME TO INTEREST YOU?
Tree bark is an almost forgotten material. While wood is a prominent example of a biomaterial that has been used since ancient times and is well established in today's applications and research, the bark is a by-product and is often considered as waste. The canoe model is the only object made of bark we found in the collection of Kunstgewerbemuseum. However, it is an object often to be found in collections of ethnographic museums in Europe, whose colonial legacies are currently widely discussed.

IN WHAT WAY DO YOU SEE CONGENIALITY, SIMILARITIES, CONTINUITIES, OR DISCONTINUITIES BETWEEN THIS OBJECT AND YOUR PROJECT?
Tree bark is often perceived in connection with the tree. Removing the bark and transforming it into a different shape creates a new way of looking at this material. The canoe model is probably inspired by a large birch bark canoe as built by first nations in the territory of Canada. The use of tree bark for canoes is rather unusual from a Western perspective. The use of bark for boats or, as in our case, for the production of a walk-in installation, makes use of the size of bark and transforms it into new forms and applications. Additionally, bark is a material that can grow several meters high. The transformation from a protective layer of the tree to a canoe takes advantage of the material's length.

IS IT POSSIBLE TO SPEAK OF MATERIAL CONTINUITIES BETWEEN THE OBJECT AND YOUR PROJECT, THAT IS, OF A HISTORICAL DEVELOPMENT OF OR IN THE MATERIAL YOUR OBJECT CONCERNS? IF YES, HOW COULD THIS DEVELOPMENT OF THE MATERIAL BE DESCRIBED?
The use of bark has significantly lessened through the industrialization process. To build a tree bark canoe, the bark was peeled off in its entirety. In today's timber production, tree bark is mainly shredded and used to produce extractives or as bark mulch. Large amounts of the material are burnt in sawmills. With the use of long woven surfaces for the bark sphere, the installation reconnects with the original

Corresponding object from the collection

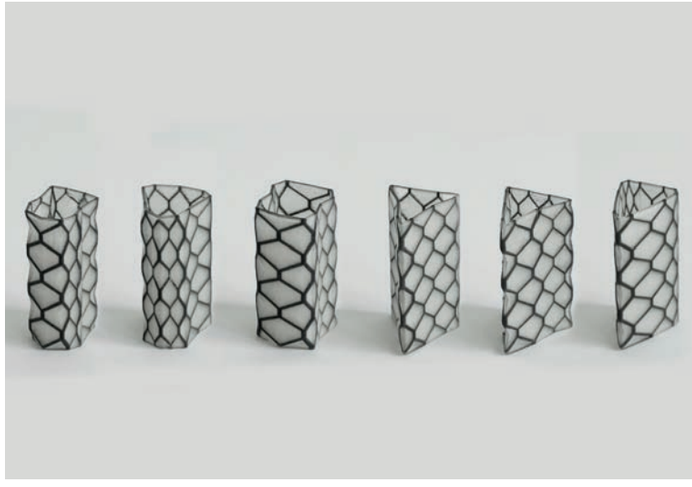
Birch bark is one of the traditional materials from which the indigenous peoples of North America, Canada and Siberia have made their boats for centuries. Knowledge of construction techniques is passed down and refined from generation to generation. Canoes made of birch bark are usually built from the outside in and are completely sustainable and durable.

It was first with the world exhibitions of the 19th century that small models of these traditional boats were presented to a wider public and, as a result, found their way into numerous museum collections. The object at hand can be regarded as a prime example of this history, as it was acquired by the museum from the Nova Scotia section of Paris World's Fair in 1867.

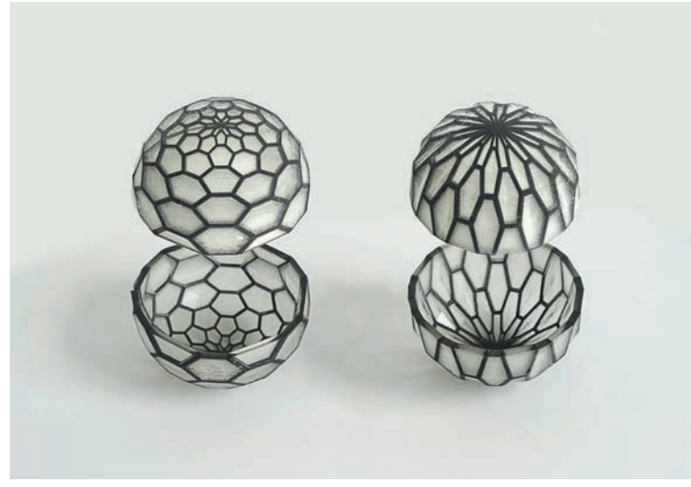
Small Canoe with two Oars, c. 1850.
[Germ. title: Kleines Kanu mit zwei Rudern, um 1850.]
Birch bark, embroidered with dyed bird feathers.
Nova Scotia.
Provenance: Acquired at the Paris World's Fair in 1867.
Inv. no.: 1868,1125 a-c

TESSELLATED MATERIAL SYSTEMS (TMS)

MASON DEAN, KAROLA DIERICHS, LENNART EIGEN, JOHN A. NYAKATURA, FELIX RASEHORN



Tessellation of boxfish crossections. Felix Rasehorn and Lennart Eigen. weißensee kunsthochschule berlin and Humboldt-Universität zu Berlin. 2022.



Tessellation of spheres. Felix Rasehorn and Lennart Eigen. weißensee kunsthochschule berlin and Humboldt-Universität zu Berlin. 2022.

In nature, tessellated morphologies appear convergently across species and on different scales. These Tessellated Material Systems (TMS) are evolutionarily successful because they unify diverse properties in one functional system. Whereas the hard tiles act as stiffening building blocks, the joints that connect them function as a soft carrier membrane allowing for flexibility. To understand the structural and functional complexity of natural tessellations, our TMS project team is comprised of researchers from morphology, engineering, material science, and design commonly interested in relating form to function. In order to create biologically inspired design solutions, design research, parametric design and experimental prototyping were applied.

The exhibition comprises two parts. PART ONE consists of three case studies conducted by students of weißensee kunsthochschule berlin, as part of Matters of Activity Design Research Studio – Designing Matter 2 "From Tile to Tessellation". The studies are based on natural specimens, including shark skin, mosquito eggs and armadillo armor, all of which have been sourced from the Tessellation Archive[1]. The exhibits show material samples and 3D printed models next to the biological samples from the Zoological collection of Humboldt-Universität zu Berlin and Museum für Naturkunde Berlin. PART TWO is an in-depth case study of tessellation growth based on a study of growth of boxfish, where 3D printed material samples will be exhibited in relation to natural specimens. The material selections are accompanied by a video work and an interactive installation that makes the Tessellation Archive accessible. Fine art prints show macro images of both natural and artificial tessellations.

[1]https://tessellated-materials.mpikg.mpg.de

"In exploring the material dichotomy between tiles and interface, we investigate TMS as a way to enhance surfaces functionally."

Tessellation of sphere (closeup). Felix Rasehorn and Lennart Eigen. weißensee kunsthochschule berlin and Humboldt-Universität zu Berlin. 2022.

HOW DID THE OBJECT FROM KUNSTGEWERBEMUSEUM COME TO INTEREST YOU?

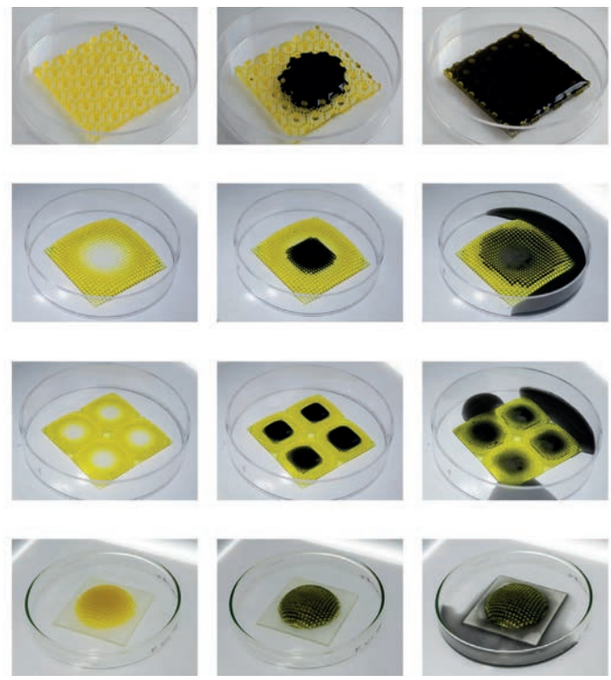
Nature's patterns have always inspired design and engineering; principles such as tiling have found application as building strategies and decoration from antiquity onwards. Tiling evolved as a building strategy to cover and decorate walls and curved surfaces. We specifically looked for objects in the collection that employ tiling techniques on curved and double-curved surfaces. The handcrafted nacre-decorated carafe and tray explicitly demonstrate what fascinates us when dealing with tessellated surfaces. These objects are crafted from an isometric material, probably metal, and later processed with the nacre piece. The way the nacre is arranged to cover and fit the host surface depends on various parameters: The size, shape, and thickness of each nacre configure, the curvature of the host surface and the technique of assembly. The resulting pattern leads to the comprehensibility of the object's geometry for both viewer and maker, resulting in an aesthetic quality that elevates it.

IN WHAT WAY DO YOU SEE CONGENIALITY, SIMILARITIES, CONTINUITIES, OR DISCONTINUITIES BETWEEN THIS OBJECT AND YOUR PROJECT?

The similarities in the surface design of the carafe and tray, and, for example the boxfish carapace are not just superficial. Instead they probably demonstrate common principles in both man-made and natural "making". In exploring the material dichotomy between hard tiles and soft interfaces, we investigate TMS as a way to enhance surfaces functionally. The nacre-decorated carafe and tray use tiling as a technique to aesthetically enhance the object. Similarities to natural patterns are evident, as the technique of applying the nacre decor to these objects relies on a specific set of rules. How do these similarities arise? Is it because natural patterns inspired the craftsmen or because the mode of assembly has an inherent logic that leads to these specific formations? We are interested in the intrinsic logic of pattern creation and its applications in design and architecture. Besides the objects of Kunstgewerbemuseum, we are fascinated with the possibility of using TMS to design context-aware surfaces. Irregularities and asymmetries in natural TMS create inherent functional properties that can be productive strategies for constructing surfaces that adapt to their surroundings. The underlying biological processes responsible for pattern formation can be regarded as functions or programs, which are, per definition, context-specific. Meaning the environment of a pattern is an essential parameter to consider. The TMS research group is interested in uncovering these principles to develop parametric designs that invite a new layer of context sensitivity into the design phase. The challenge of applying principles of TMS in real-world scenarios is therefore not purely technical but involves the implementation, coordination, and evaluation of contextual information found through design practice.

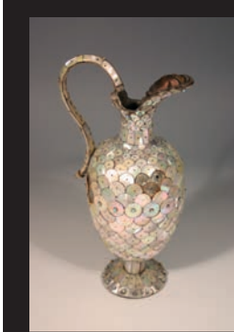
IS IT POSSIBLE TO SPEAK OF MATERIAL CONTINUITIES BETWEEN THE OBJECT AND YOUR PROJECT, THAT IS, OF A HISTORICAL DEVELOPMENT OF OR IN THE MATERIAL YOUR OBJECT CONCERNS? IF YES, HOW COULD THIS DEVELOPMENT OF THE MATERIAL BE DESCRIBED?

We can only measure what we can see or render visible. Therefore, the mimetic approach towards nature's structures correlates with the technological advancements in microscopy, sensing, and imaging. The ability to study microstructures has led to the understanding that most biological materials are organized hierarchically. This is true for the nacre, which in itself resembles a tessellated structure. The technique that created the nacre is considered in the decor process; this can be understood as a hierarchical design approach. How could we learn from this? In our process, we heavily rely on Computer-Aided Design and Manufacturing (CAD/CAM), employing synthetic materials with isotropic material properties. Most natural materials are anisotropic, meaning they are adopted explicitly for certain functional aspects. We should develop ways of embracing those functionalities as features instead of failures. One way of doing this is by feeding specific material properties into a parametric design model to consider them. Another way is through model-making and prototyping.



Water-guiding surfaces. Leila Wallisser. weißensee kunsthochschule berlin. 2021.

Corresponding object from the collection



As a part of a set of handwashing accessories, the pitcher expresses indulgence, completely covered in discs of nacre, also known as "mother of pearl", held together by turquoise pins.

Dating back at least 5,000 years, nacre has a long and intriguing history of being used for artistic crafting. In addition to its significant material and aesthetic values, mother of pearl has traditionally also been used for medical purposes and played important roles in religious practices since antiquity and throughout the Middle Ages. Its shimmering and luxurious appearance, as well as its origin from distant lands, made nacre in the 16th and 17th century a coveted material for numerous showpieces of the European cabinets of curiosities.

Material scientists have critically investigated the extraordinary qualities of nacre, as the material continues to fascinate with its capacity to be exceptionally hard and incredibly elastic at the same time. Results of this research have already opened gateways for a new generation of shatterproof ceramic materials, aiming for improved capabilities of enduring wear and pressure.

Pitcher. [Germ. title: Kanne.]
Nacre: India (Gujerat), Turquoise, Processing: South Germany.
First half of the 17th century.
Provenance: Acquired in 1810 from the Kunstkammer in Ansbach.
Inv. no.: K 3487

INFAUNA | A BIOMATERIAL CULTURE

VALENTINA ALIAGA, MARÍA JOSÉ BESOAIN, NICOLAS HERNANDEZ, HEIDI JALKH, ALEJANDRO WEISS

“The nautilus is a standalone element. INFAUNA, on the other hand, is a system: the material, the tool, the piece, and the spatial arrangement of multiple pieces.”

Infauna's module layout.

First prototype of the piece over crushed mussel shells.

This project is a space for collaborative experimentation that allows exploring new morphological, sensory, and narrative possibilities around biomaterials that use sea shells (*Mytilus chilensis*) as the main resource. The ongoing exploration of INFAUNA proposes a DIY device that yields a series of morphological pieces created from a system of tensions. These tensions contort bioceramic shells into new shapes, creating curves and counter curves, reproducing textures while generating boundaries and finishes of new sculptural objects. The resulting geometries are a reflection of the experimentation with different variables, which include: the biomaterial recipe (granulometry and density), the denier of the textile (elasticity and texture resolution), the frame (size and degree of tension of the assembly of the fabric) and the tensioning buttons (button geometry and the force/weight of the tension). The explorations under this matrix result in unique and irreproducible pieces that give a new value to domestic and industrial waste. INFAUNA is a collaborative project between LABVA (Laboratorio de Biomateriales de Valdivia), the designer and ceramist Heidi Jalkh, and architect Nicolás Hernandez. Together, they executed various analog and digital manufacturing exercises to open replication possibilities at different technological levels.

Detail of the device before demolding.

HOW DID THE OBJECT FROM KUNSTGEWERBEMUSEUM COME TO INTEREST YOU?

HEIDI JALKL LABVA and I started a self-commissioned collaborative work in 2021 that resulted in an eggshell biocalcification project called Ovofilia. Dr. Lorenzo Guiducci became aware of our project while we worked together in Berlin. When he visited Kunstgewerbemuseum he saw the nautilus cup which sparked a connection to him due to the base material and the biocalcification process. So at the time, we started thinking about what other materials we could use that were more closely related to the nautilus cup. We were able to replace the main ingredient given that it provided the calcium calcinate needed to create a similar biocalcification process. With that in mind, it was important to look for a species/resource that could be found in abundance and used in a domestic setting, hence *Mytilus chilenis*, a species of mussel native to the coasts of Chile, Argentina, and Uruguay.

DR. LORENZO GUIDUCCI INFAUNA's material biography is that of mineralized biogenic materials (shells). In the museum's nautilus series, noble metals and the finest techniques are used to "elevate" a bare, otherwise seemingly worthless shell. They represent an old narrative of abundance: of materials (silver), of time (taken to fabricate the fine cups), of means (through patronage). With INFAUA, on the other hand, a seemingly worthless object like a seashell becomes valuable thanks to the biomaterial recipe developed by LABVA. With today's raw material scarcity as a boundary condition, re- and upcycling becomes an urgent matter.

IN WHAT WAY DO YOU SEE CONGENIALITY, SIMILARITIES, CONTINUITIES, OR DISCONTINUITIES BETWEEN THIS OBJECT AND YOUR PROJECT?

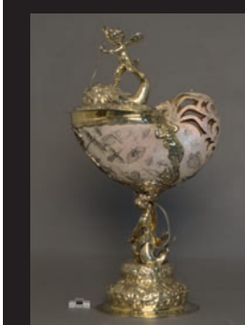
On congeniality: Both objects are one of a kind, in our project each piece is also handmade. The shape is given by the tool in relationship with accessories and parameters; any variation of these elements yields different and unique shapes. This craft process also embeds value in the base material and the final piece.

On continuities: According to Kunstgewerbemuseum, "Natural materials with unique qualities were transformed by human artifice into prestigious objects." We can see that this is true in both cases through the use of seashells as the main element (although from different species). They are objects of contemplation, and the functional use is hardly important. The precious materials and striking designs suggest that the function of such goblets was purely feigned (simulation), and that these precious objects were "never used for drinking", as Kunstgewerbemuseum also describes. In the INFAUNA project, the objects are designed as tiles to create a three-dimensional decorative surface.

On discontinuities: In the museum's nautilus, the main material is the natural form consisting of an identifiable shell. INFAUNA is a biomaterial composed of many shells whose source can only be recognized up close. Otherwise, it can be mistaken for other types of material (such as ceramic or cement). The nautilus became a scarce and endangered species. Its value lies in its shape and rareness. It was brought from remote locations to be crafted and used in Europe. In contrast, *Mytilus chilensis* is found in abundance, on the coasts of Chile and Argentina, allowing it to be locally sourced, eaten, and then repurposed as a material. The nautilus is a standalone element. INFAUNA, on the other hand, is a system: the material, the tool, the piece, and the spatial arrangement of multiple pieces. The nautilus was and still is luxurious, exotic and a symbol of opulence as well as status. In INFAUNA, the material comes from the ordinary, the austere, and tradition as it is a cultural symbol of southern Chilean gastronomy. The nautilus shell is crafted with metallic ornaments that add value to the object, while INFAUNA tiles are made with just the shell composite. Therefore, our project shifts "value" to the tool that shapes the material. The INFAUNA tool is created through digital fabrication. When looking at the nautilus, the focus is centered on its external properties i.e. the exposed nacre (mother pearl). Whereas in our project, the focus lies on internal properties of the shell, and its ability to become recalcified.

Infauna forming device (cast bronze).

Corresponding object from the collection



The figurative decor of the goblet recalls the genesis of the nautilus shell. Its shaft features a female fish and the goblet is crowned by a dolphin-riding spirit. During the 16th and 17th century in Europe, goblets containing nautilus shells were one among the most treasured objects collectors desired to add to their cabinets of curiosities.

The shimmery nacre shells of the common nautilus (*nautilus pompilius*) were decorated and transformed into magnificent vessels by first being bleached and then placed in precious metals by Renaissance and Baroque goldsmiths.

They can be considered to reflect the great interest for the, at the time, new and exciting materials from distant lands and they usually depict some artistic appropriation of nature by man. The nautilus, a close relative to the octopus, was and remains today an interesting object for most natural history collections, as it is one of a few living fossils around us, dating back many millions of years. Today, the nautilus still makes a prestigious souvenir and is considered to be endangered due to the continued passion for collecting and possessing it.

Nautilus Goblet with Insects.
[Germ. title: Nautiluspokal mit Insekten.]
Gdansk and Amsterdam, possibly Jean Bellekin.
Nautilus shell (*nautilus pompilius*) engraved, silver gilt.
Second half of the 17th century.
Provenance: Acquired 1835 from the collector F.F. Nagler.
Inv. no.: K 3465

VASCULARIZATIONS

EMILE DE VISSCHER

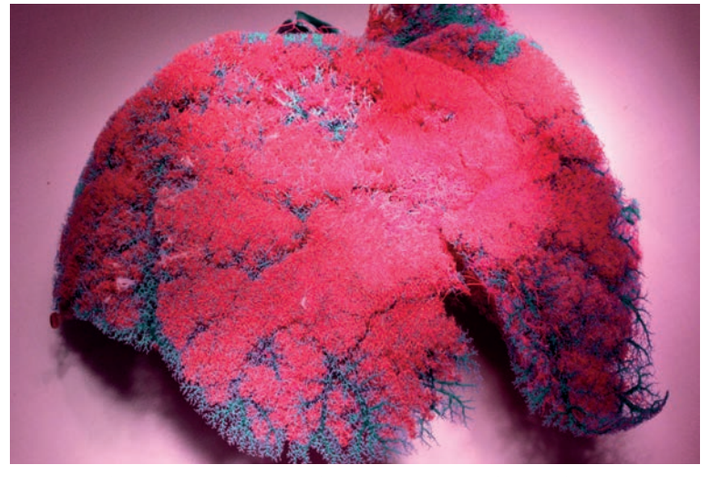
Emile De Visscher, electrical treeing by partial discharge of a PMMA block, detail. Conducted at LSI Lab, École Polytechnique. Thanks to EMIR&A research network. 2021, @Palta Studio.

"As it turns out, the process at stake in my work is closer to growth than shrinkage, and if there is one typical dendritic structure generated by growth, it is the coral."

Vascular structures are paradigmatic examples of the biological realm. Organs, corals, or mycelium all exhibit complex tubular geometries which optimize exchanges and provide room for healing, evolution and activity. Although slow to grow, these systems are extremely efficient and rely on little energy compared to mechanical or electrical alternatives.

Vascularizstions explores different methods to generate vascular structures in biocompatible materials. It sparked from the scientific work of Igor Sauer, surgeon and Head of the Experimental Surgery Lab at Charité Hospital, and Marie Weinhart, biochemist at Freie Universität Berlin, who collaborate to find innovative ways of producing artificial organs with hopes to alleviate donation scarcity. Extending this research in oncology and biochemistry to design and architecture. The project investigates spontaneous tubular material formations.

One experimental setup developed during this research relies on a surprising natural phenomenon: fulgurites. When lightning hits a sandy ground, the sand melts in specific tubular patterns. This principle, known as electrical treeing, has been reproduced at much smaller scales in several polymers. The samples are then exposed to an electron beam with high velocity, trapping electrons in the insulative material which are then released by hitting a nail on the sample. The electrons escape instantly, vaporizing the polymer in the shortest path possible and creating an optimized dendritic network, similar to the matrices of human organs.



Dietrich Polenz and the ExperimentalSurgery Lab. Cast of a rat liver. Charité Hospital. 2020. @Dietrich Polenz.

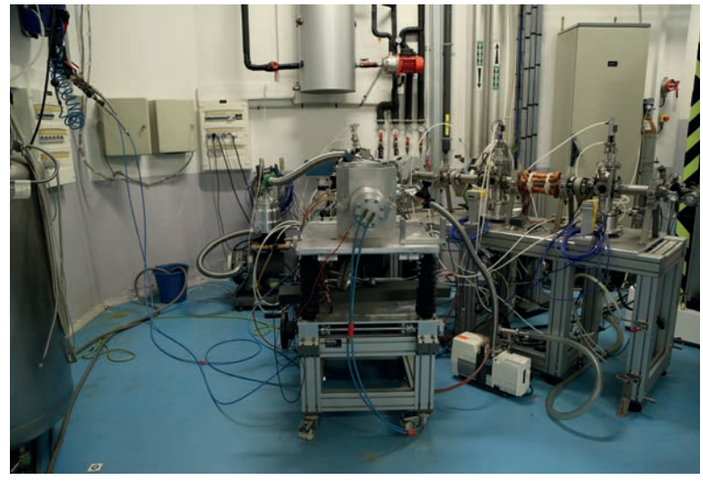
Project conducted with support of Marie Weinhart, Freie Universität Berlin, and Igor Sauer, Charité Hospital, Vascularization strand from the "Material Form Function" Research Group. Electron Irradiations conducted at the LSI Lab, École Polytechnique, Palaiseau, France, with the help of Antonino Alessi, Romain Grasset and Olivier Cavani. We acknowledge the French EMIR&A network for provision of irradiation beam time. Installation with support by Elisa Seban and Clara Martini. Video and documentation of the project conducted by Palta Studio and Boris De Visscher. Analysis with support of Marcus Lindner, Freie Universität Berlin.

HOW DID THE OBJECT FROM KUNSTGEWERBEMUSEUM COME TO INTEREST YOU?
I had the chance to visit the collections and the storerooms with Claudia Banz, curator of design, who already knew my work on vascular processes. She suggested several objects, including some that displayed glass or enamel techniques where crack propagation structures generate dendritic patterns. As it turns out, the process at stake in my work is closer to growth than shrinkage, and if there is one typical dendritic structure generated by growth, it is the coral.

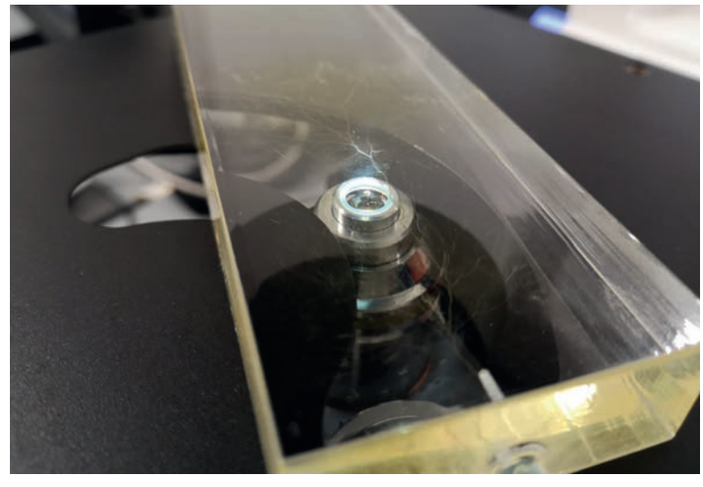
IN WHAT WAY DO YOU SEE CONGENIALITY, SIMILARITIES, CONTINUITIES OR DISCONTINUITIES BETWEEN THIS OBJECT AND YOUR PROJECT?
Presenting a coral in relation to my work made sense to me. First, because, fundamentally, corals are architectures for microorganisms. In the same way as vascular networks, corals are composed of complex tubular structures, which help optimize exchanges with their environment and allow microorganisms to populate and interact. Furthermore, I was interested in the object's provenance, as it is part of "Wunderkammern", the cabinet of curiosity. Cabinets of curiosity combine scientific and theatrical aspects, precede modern disciplinary divisions, and thus contribute to making natural, artificial, craft, scientific, and playful processes commensurable. My work links technical and scientific dimensions with aesthetic, symbolic, and political considerations. Furthermore, it associates different design regimes made graspable through exhibition and performance. Thus, my work is intrinsically related to the tradition of "science de salon" or cabinets of curiosity.

IS IT POSSIBLE TO SPEAK OF MATERIAL CONTINUITIES BETWEEN THE OBJECT AND YOUR PROJECT, THAT IS, OF A HISTORICAL DEVELOPMENT OF OR IN THE MATERIAL YOUR OBJECT CONCERNS? IF YES, HOW COULD THIS DEVELOPMENT OF THE MATERIAL BE DESCRIBED?
The materials are obviously very different, and I don't believe can be linked. However, an interesting question raised by this association concerns bio-inspiration and its legacy. Coral, like the nautilus shell, has been one of the most powerful natural inspirations when considering the "intelligence of nature". You can also find bio-inspiration extremely present in the history of design and architecture. In a way, Matters of Activity follows this tradition as well. History tells us that bio-inspiration has often been conducted in a formal, non-processual manner. In the context of the exhibition, there is undoubtedly a link made between biology and technology, but this link is based on self-generation processes of forms by the potential energies stored in matter, and not by form copies. The topographical optimization, found in coral as well as in the structure of organs, is due to an internal process rather than to an aesthetic reconstruction. I look forward to discussing the evolution of the concept of bio-inspiration, as well as its limits and dangers in scheduled discussions and events.

ARE THERE OTHER TYPES OF LEGACIES BETWEEN THIS OBJECT AND YOUR PROJECT? IF SO, HOW WOULD YOU DESCRIBE THEM?
In the work I present, I consider myself as a complete amateur. I have had the chance to collaborate with surgeons, physicists, nuclear engineers, and biochemists. Although I tried to understand what they do, it was quite impossible for me to access their scientific knowledge. So, I acted as an amateur, as a go-between to create dialogues. I tried to make objects, discourses, and materials travel from one discipline, one laboratory, to another. In addition to the coral and my vascular networks generated by electric discharge, the amateur sculpture by one of the surgeons of the Laboratory of Experimental Surgery at Charité Hospital will be presented. Initially, this researcher started to cast resins in his specimens only for himself. Gradually, he developed a technique and produced more and more of them in his spare time. Through encouragement by his colleagues, he has come to display his casts in the display cases found in the laboratory's corridors. It is an honor to invite him to present his work in a museum. Overall, I see a strong connection between the amateur designer/researcher, the amateur sculptor/surgeon, and the curiosity cabinet of the amateur scientist/collector.



Laboratoire des Solides Irradiés. Electron beam chamber where the samples are placed to receive irrdatiation. École Polytechnique. Palaiseau. 2021. @Emile De Visscher.



Emile de Visscher. Analysis of the vascular network generated by partial discharge. Freie Universität Berlin. With support of Marcus Lindner. 2021. @Emile de Visscher.

Corresponding object from the collection

Coral has a special quality that makes it the ideal material for objects in the cabinets of curiosities; In water, their native habitat, corals are soft and flexible but as soon as they come into contact with air, they harden and turn brittle.

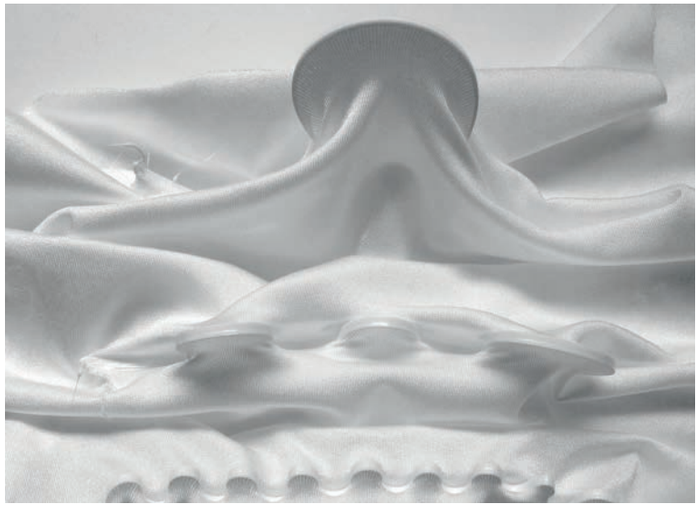
Corals are both natural and artificial. As such, their material properties reflect the two overarching categories of every Baroque cabinet of curiosity, "Naturalia" and "Artificilia". Their ability to transform from transient to permanent together with their blood-red color also charged them with special meaning within the context of Christian symbolism.

Today, coral jewelry can still be seen worn, often under the assumption that it protects against the "evil eye". However, the existence of over 75% of the world's coral reefs is now threatened due to the effects of environmental pollution.

Knife from a Set of Coral Cutlery.
[Germ. title: Messer aus einem Prunkbesteck.]
Metal, coral (*corallium rubrum*).
17th century.
Inv. no.: HM8924

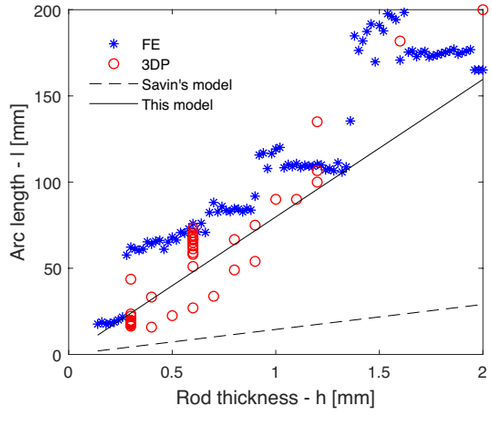
SELF-SHAPING TEXTILES

LORENZO GUIDUCCI, AGATA KYCIA



How to control the wavy shape of 3D printed lines. Left: Influence of line thickness (increasing from bottom to top); Right: Influence of textile pre-stretch (increasing from top to bottom).

Multiple parallel lines self-organizing into a tube/roll.



A plot showing the linear relationship between rod (line) thickness and the length of the wave appearing after textile pre-stretch is released.

Our project focuses on creating meter-scale surface structures by transforming 2D surfaces into 3D wrinkled structures. Inspired by morphogenetic processes in plant leaves, we propose using 3D printing on pre-stretched textiles as an alternative, material based form-finding technique to obtain meter-scale surface structures for architectural elements such as facade panels and shading elements. In particular, we explore the design space of non-intersecting lines that self-organize into visually complex macroscopic patterns and surface textures upon fabric tension relaxation. In their morphed state, these textiles exhibit various optical and elastic properties promoting numerous visual and tactile sensations for the spectator.

The large format prints featured in Design Lab #13: Material Legacies are both an opportunity to establish a dialogue with the spectator while constituting “fieldwork” experiments to test the effect of additional external conditions (i.e., the shaping impact of residual tensioning due to the fabric weight). Similarly, the the dress by Madame Grès stages a dialogue between pure fabric and external conditions, represented by the female body. A new perception of the female body and femininity is achieved by stripping the dress of all traditional tailoring solutions and customs. Remarkably, in both our and Madame Grès’ work, what seems “simple” conceals a much more complex phenomenon (the self-shaping of the textile as active matter) and deeper consideration of all aspects at play (light, sound, gravity, space, body, customs).

"We want to put our work (...) to create space for discussions on textile materiality and, specifically, the future role of textiles in fashion, architecture, and technology."

HOW DID THE OBJECT FROM KUNSTGEWERBEMUSEUM COME TO INTEREST YOU?

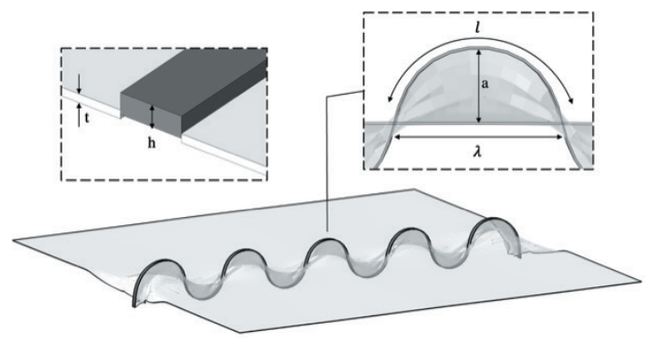
Very simply, the fact that the dress is made of fabric – the same material we work with. The dress displays a unique use of textile (up to that time at least): The material itself defines the aesthetic attributes of the dress. The textile shine, the fine-scale folds, are combined with simple shapes that envelop the female form. The shape is not imposed from the outside (with crinoline for instance), nor is there adherence to traditional custom. To be honest, we do not consider ourselves fashion experts. Still, we can see a clear split between this dress and the earlier fashion styles, even if from a few years before – this dress is a clear anti-conformist statement. This ability to create shape with the materiality of the textile, rather than imposing it, is what connects our research and physical prototypes. In our prototypes, we integrate stiff plastic materials into the fabric: in this way, we augment the textile and leverage its elastic properties to obtain 3D shaping without sewing or cutting. This stiff plastic is integral to the textile – unlike the crinoline used in dresses in the early 1900s, which create a prefixed shape and serves as a scaffold for the textile to be deployed on. The stiff plastic beams in our prototypes deform under the action of the stretched textile: a wavy, wrinkled, three-dimensional shape emerges. Our interests lie in understanding such spontaneous shape generation, controlling, and envisioning applications in the architectural domain. We see our prototypes as textile composites (consisting of the fabric and the deposited thermoplastic material), which blend together and become one.

IN WHAT WAY DO YOU SEE CONGENIALITY, SIMILARITIES, CONTINUITIES, OR DISCONTINUITIES BETWEEN THIS OBJECT AND YOUR PROJECT?

The 3D printed textile surfaces we display in the exhibition should work as a vision for the role of textiles in architecture – as soft, permeable and reconfigurable elements. This is quite a departure from the usage of stable materials such as steel and glass, which are still dominating today. Similar to the way that the dress creates a discontinuity with the past. Attention to how the textile's material properties (weight, stretch, shine, etc.) create the final shape and appearance inherently relates to the dress. We want to put our work in dialogue with the dress to create space for discussions on textile materiality and, specifically, the future role of textiles in fashion, architecture, and technology. Another aspect that can be mentioned in regards to congeniality is the idea of a shape reacting to its context. In case of the Madame Grès' dress, it follows the curvatures of the female form. In the case of our prototypes, the shape of the large-scale textiles depends on spatial parameters such as the force of gravity, the anchor points where it is hung, and its own weight. These aspects work together with the programmed undulations to define the final form. In both cases, the softness and elasticity of the fabric allows it to continuously change: the dress taking different shapes as the person moves, our textile changing shape depending how it is hung and variations in transparency levels depending on the lighting conditions/viewer's perspective.

IS IT POSSIBLE TO SPEAK OF MATERIAL CONTINUITIES BETWEEN THE OBJECT AND YOUR PROJECT, THAT IS, OF A HISTORICAL DEVELOPMENT OF OR IN THE MATERIAL YOUR OBJECT CONCERNS? IF YES, HOW COULD THIS DEVELOPMENT OF THE MATERIAL BE DESCRIBED?

There is an obvious continuity of the material used – textile – in the dress and our prototypes, although historically speaking, the textiles themselves are quite dissimilar. The dress is made of jersey, and the prototypes are made of Lycra, a 100% synthetic fiber based on polyurethane. Both are knitted fabrics and have a certain sheen. Still, over the centuries, there have been many technical improvements in weaving/loom technology and even chemistry to create new synthetic fibers. We use Lycra mainly for its elasticity as it can be stretched up to 150% and still recover its stretch. In the Madame Grès dress, it seems that jersey has been used mainly for its softness and weight. In fact, a very long textile piece was folded into small and very dense folds at the waist, allowing the skirt to smoothly fall down. I believe that the technological development of textiles and/or fabrication methods have always opened both new fashion trends and specialized applications. Consider the spacesuit of the Apollo missions made with high-tech fabrics or the use of 3D printing on textiles in high couture today: textiles are as ornamental as technical, and this has always been the case, even in antiquity. Another important aspect is the idea of local differentiation in the material, which we try to obtain through the different patterns of the 3D printed filament. This allows for varying levels of stretch in the fabric, thus resulting in different undulations. In the case of the dress, it is done through the special folding. In both cases, the chemical composition stays the same; what changes is the structure.



A computational model (finite element - FE) of a single line 3D printed on a pre-stretched square piece of fabric.

Corresponding object from the collection

Originally trained as a sculptor, the Parisian artist Germaine E. Krebs started her own business as a fashion designer in the 1930s under the name "Madame Grès". She became famous for her flowing silk dresses, reminiscent of garments from antiquity. Madame Grès quickly became a master of cut-outs and asymmetries, turning her dresses into expressive works of art. The designer also developed her designs without scissors and needles, as she preferred shaping them directly in contact with the human body.

The evening dress at hand is made out of jersey, a sleek and elastic material named after its origin in the Channel Islands. This relatively inexpensive fabric was introduced to the Parisian fashion world by Coco Chanel at the beginning of the 1910s and came to be one of the textile materials Madame Grès held dearest.

Two-piece Evening Dress. [Germ. title: Zweiteiliges Abendkleid.]
Madame Grès.
Paris, after 1973.
Pure white single jersey, viscose-synthetic blend.
Provenance: Acquired 2003 from the Kamer/Ruf collection; 1998 Madame Grès sale, Christie's London.
Inv. no.: 2003, KR 634a,b.

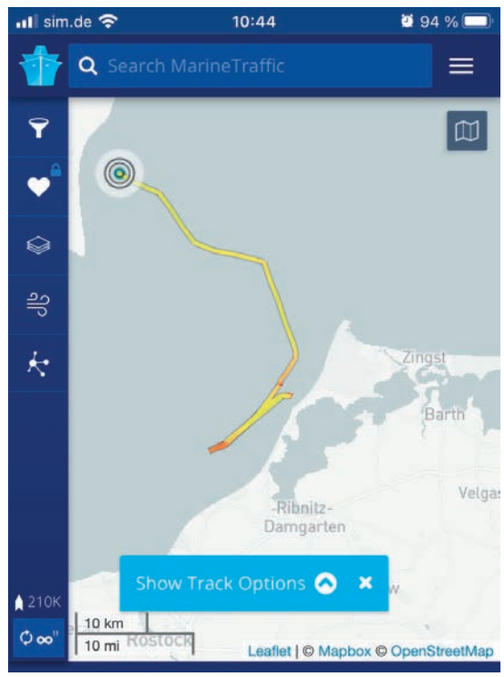
ASSEMBLING THE COAST

MICHAELA BÜSSE, ANDREAS KÜHNE, KONSTANTIN MITROKHOV

The sand is pumped through a pipe and distributed on the coast. Film still. Assembling the Coast. 2022.

“Sand is not just a matter that can be found at beaches around the world, but it is fundamental to our infrastructure, the built environment, and digital technologies.”

Assembling the Coast is a sensorial-ethnographic investigation of a coastal replenishment project on the Baltic Sea, close to Ahrenshoop. Erosion and rising sea level lead to coastal retreat and frequent replenishments are used to counteract this process. The film work captures the interplay of man, machine, and matter as they perform the laborious process of transforming the environment. Intimate shots and on-site sound recording convey an immersive experience that contrasts the violence of land reclamation with the unruly behavior of sand, wind, and water. Our aim is to emphasize that the beach is not just there, but it is made and continues to be remade by competing forces, human and other. As such, the work also functions as a reminder that what we conceive of as “nature” is not self-evident. Most of our surroundings are shaped by technologies processes resulting in landscapes that are both natural and constructed. Assembling the Coast is a collaboration by researcher and filmmaker Michaela Büsse, sound artist and composer Andreas Kühne, and visual researcher and cinematographer Konstantin Mitrokhov.



The Marine Traffic App helps us locate the ship and track the origin of the sand. Screenshot. Michaela Büsse. 2022.

The dredging ship runs 24/7 disposing of sand every 4 hours. Film still.
Assembling the Coast. 2022.

HOW DID THE OBJECT FROM KUNSTGEWERBEMUSEUM COME TO INTEREST YOU?

Phones are often used as reference objects when talking about rare earths and exploitative practices that are associated with their mining. What many people don't know is that sand is the second most used resource in the world (after water) and an essential ingredient for many products, one of them being the phone. The microchip that is built into the smartphone and into many other electronic devises is made of silicon and silicon is made of quartz sand. In fact, quartz is the most common element of sands. We could have also pointed to the concrete walls of the museum, or its glass windows – two of the other important use cases of sand. It's crucial to understand that sand is not just a matter that can be found at beaches around the world, but it is fundamental to our infrastructure, the built environment, and digital technologies.

IN WHAT WAY DO YOU SEE CONGENIALITY, SIMILARITIES, CONTINUITIES, OR DISCONTINUITIES BETWEEN THIS OBJECT AND YOUR PROJECT?

The video work deals with the laborious and extractive processes behind the seemingly natural phenomenon of the beach. It speaks to the fact that most of our environments are not just "there" but are made. These processes are often invisible to us; that is to say, the massive transformation of matter that takes place on an everyday basis gets normalized. But these transformations come at a cost. Be it for the mobile phone, the beach, or for concrete production – the world is running out of sand. There are no international regulations in place for the mining of sand and many sand transports don't get registered which incentivizes illicit practices. This is most acute in places with a high demand for sand, e.g. Southeast Asia and India, and less acute here in Europe, where we have less demand and more sand deposits.

IS IT POSSIBLE TO SPEAK OF MATERIAL CONTINUITIES BETWEEN THE OBJECT AND YOUR PROJECT, THAT IS, OF A HISTORICAL DEVELOPMENT OF OR IN THE MATERIAL YOUR OBJECT CONCERNS? IF YES, HOW COULD THIS DEVELOPMENT OF THE MATERIAL BE DESCRIBED?

On a very fundamental level, the video work challenges thinking in dichotomies such as natural/artificial and nature/culture. By recognizing that what we conceive of as nature is contingent on our framework of thinking, we might be able to transgress dichotomies and become more open to other conceptions of nature and culture not typically aligned with our worldview. At the same time, it is important to acknowledge the exploitative practices shaping our everyday life and the objects and infrastructures surrounding us. We all know about the massive amounts of plastic and electronic trash produced by cheap labor, consumed fast and disposed of elsewhere, where they continue to pollute the environment. Sand extraction comes with a lot of violence, too. It's mining leads to coastal erosion, the displacement of people, the degradation of ecosystems and the disappearance of whole island. It is not enough to think of alternative materials or more sustainable production and by doing so shifting the problem elsewhere. By analysing material legacies, we come to realise that the understanding of nature in the Global North is always-already extractive and that we have to radically challenge this position instead of searching for a technological fix. The Fairphone is a fitting example: even though it promises sustainable production it still relies on Google's infrastructure.

Corresponding object from the collection

Smartphones contain dozens of materials entangled in complex and globally interconnected supply chains. On average, they are made of 45 % metal, 32 % glass, 17% plastic and 6% other material composites. Of particular concern are the so-called "conflict resources", some of which are extremely rare and extracted under precarious social and environmental conditions. Regarded as "conflict resources", apart from gold, palladium and lithium, are also other more rare and uncommon metals and minerals such as neodymium and tantalum. Sand, however, has not been recognized as valuable material and hardly ever shows up in any material repository.

The Fairphone is built around the mission to make the electronics industry more socially and environmentally sustainable along the entire supply chain. This also includes investing in circular practices that embrace innovative models for recycling materials post consumption. Yet, the first edition of Fairphone was criticized for not containing any truly fair elements, for using Google's Android operating system and for, as a result, having to use the same constituents as other smartphones.

Fairphone.
First Edition, 2013-2015.
Design: Fairphone B.V., Amsterdam. Production: China.
Glass, plastic, metals, lithium, rare minerals.
Inv. no.: –

PARTICIPANTS

Graphic designer VALENTINA ALIAGA was born in Chile. Following her bachelor's design studies, Aliaga formalized her multidisciplinary skills in visual and strategic communication scenarios. Her work aims to recognize the ongoing changes in material culture that impact the concepts of time, abundance, territory, and, more generally, the quality of relationships. Aliaga is Co-founder and Graphic Designer at LABVA.

Architect MARÍA JOSÉ BESOAIN received her Master's Degree in Landscape Architecture from the Catholic University of Chile and a postgraduate certificate in Spatial Analysis (GIS) from the University of Chile. Besoin is a biodesigner focused on creating and developing native biomaterials through biofabrication. She also acts as Co-Founder and Lab Manager of LABVA (Valdivia's Biomaterials Laboratory), an autonomous, self-managed, and citizen kitchen/laboratory focused on the research, experimentation, and prototyping biomaterials.

MICHAELA BÜSSE is a Research Associate at the Institute of Cultural History and Theory at Humboldt-Universität zu Berlin and Associated Investigator at Matters of Activity. She is interested in the interplay of material practices, technologies, and social imaginaries and the way they (re)configure environments. Her dissertation project analyses land reclamation projects in Southeast Asia and the Netherlands and based on sand's granular physics develops a performative reading of design.

MASON DEAN is a City University of Hong Kong professor. As a marine biologist, zoologist, and anatomist, Dean studies the skeletal development, structure, and function in animals, focusing on fishes. He is also a Guest Scientist in the Department of Biomaterials, Max Planck Institute of Colloids and Interfaces (where he previously led a research workgroup) and Associated Investigator at Matters of Activity, collaborating with designers, engineers, and architects to study anatomy.

EMILE DE VISSCHER is a mechanical engineer, designer and practice-based researcher exploring new manufacturing methods and materials. Not only does he look for alternative technologies, but also tries to unfold the political, ecological, aesthetical and symbolic entanglements that these developments could generate and modify. Emile De Visscher is currently Research Associate in Material Form Function research group at Matters of Activity.

KAROLA DIERICHS holds the Professorship "Material and Code" at weißensee kunsthochschule berlin as part of Matters of Activity. Previously, she served as a Research Associate at the Institute for Computational Design and Construction (ICD) within the Cluster of Excellence "Integrative Computational Design and Construction for Architecture" (IntCDC). Dietrich's interdisciplinary research has led to national and international collaborations, including published works and features in international exhibitions, and has won several awards.

LENNART EIGEN is a Pre-Doctoral Researcher at Matters of Activity, with a degree in Organismal Biology, Biodiversity, and Evolution from Humboldt-Universität zu Berlin. He is pursuing his Ph.D. at Bernstein Center for Computational Neuroscience in Berlin, exploring novel imaging techniques and 3D digital visualization in Neuroscience. In his current work, he investigates the form-function relationship and architecture of biological systems and how to use them for engineered structures and synthetic materials.

LORENZO GUIDUCCI is a biomedical engineer teaching and conducting research at the intersection of science, design, and architecture. He earned a Ph.D. in Physics (Max Planck Institute for Colloids and Interfaces, University of Potsdam) for his work on the actuation principles of pressurized cellular tissues in plant seed capsules. He is currently co-leading the Material Form Function research group at Matters of Activity and further investigating shape-changing materials and mechanical metamaterials such as 3D printed textiles, auxetics and kirigami.

Architect NICOLAS HERNANDEZ from the University of Chile focuses on housing design. Hernandez is a collaborator at LABVA where he specializes in 3D modeling, digital fabrication, and photography, allowing him to experiment with biomaterials through shape and form.

HEIDI JALKH is an experimental designer, trained in industrial design. She is a specialist in logic and technique of form and holds a Master's Degree in Interdisciplinary Research from HU/UBA. She is an educator and Director of the research group Sistemas Materiales. Parallel to these academic engagements, Jalkh develops her professional practice as a designer through her many interests including craft, the design and manufacture of bio-inspired and bio-based materials as well as interdisciplinary research.

As a Composer, Sound Artist, and Drummer, ANDREAS KÜHNE creates electroacoustic music, collaborative audiovisual performances, and interactive installations. Aiming to channel synergy between disciplines, he develops audio/visual interfaces through extended (analog) techniques, live electronics, and electronics design.

AGATA KYCIA is a Berlin-based architect and researcher fascinated by the potential intersections of computational design, digital fabrication, and material science. She has worked as a lead architect at HENN in Berlin and lectured at various universities (TU Delft, Architectural Association VS, Fachhochschule Düsseldorf, TU Berlin, IaaC Barcelona, IED Madrid). She obtained her doctoral degree from the TU Berlin for her research on self-shaping textiles. Currently, she investigates the role of digital teaching formats through experimental prototyping and robotic fabrication at weißensee kunsthochschule berlin.

CLAUDIA MAREIS is an expert for Design as well as Cultural History and Theory. Since 2021, she has been Professor of Design and History of Knowledge at the Department of Cultural History and Theory at the Humboldt-Universität zu Berlin. Her research interests include history, theory and methodology of design in the 20th century, knowledge cultures in design, experimental design and media practices, cultural history of creativity, design and material politics. Claudia Mareis is Co-Director of Matters of Activity and coleads the cluster with Horst Bredekamp, Peter Fratzl, and Director Wolfgang Schäffner.

KONSTANTIN MITROKHOV'S practice extends across imagemaking, writing, and academic research, focusing on open-ended modes of truth production enabled by computation. He works with moving image and UX/UI design as vehicles for practice-based inquiry. Additionally, Konstantin collaborates with other researchers as a cinematographer and video editor.

JOHN NYAKATURA Is an evolutionary biologist. He studied Biology and Geography at the Friedrich Schiller University in Jena, Germany. He earned his doctoral degree in Zoology with a dissertation on mammals' evolution and functional morphology. He has researched the form-functioninterface in the musculoskeletal system of salamanders, lizards, birds, and primates which allowed him to routinely collaborate with paleontologists, biomechanists, roboticists, and scientific illustrators. Since 2014, Nyakatura has served as junior professor at Humboldt-Universität zu Berlin where he leads a group concerned with the functional morphology of vertebrates and with historical and epistemic aspects of image use in his field. In 2019, he was appointed as visiting professor at Zürcher Hochschule der Künste.

FELIX RASEHORN Is a designer and Pre-Doctoral Researcher at Matters of Activity and a practice-based Ph.D. candidate at TU Berlin. He studied product and interaction design at weißensee kunsthochschule berlin. In his doctoral studies, he is interested in the convergence of tessellated morphologies in nature. His research focuses on structure and materiality, aiming to develop methods for hierarchical designs that lead to multi-functionality and context sensitivity.

IVA REŠETAR is a practicing digital and experimental design architect and has held several teaching and research positions, including at Akademie Schloss Solitude, weißensee kunsthochschule berlin, and the University of the Arts Berlin, among others. Her environmental design research focuses on the relationship between climates, architecture and environmental technologies, thermodynamic processes, and textile materialities. Rešetar has been a Research Associate at Matters of Activity since 2019.

CHRISTIANE SAUER focuses on developing and designing material systems for the architectural context based on textile structures, active materials, and functional surfaces. She has previously held various international teaching positions, including Professor for Material Design at weißensee kunsthochschule berlin since 2013. Sauer has worked as a practicing architect internationally and founded Formade, a studio for architecture and materials in Berlin, and cofounded a research facility, DXM - Design Experiment Material at weißensee kunsthochschule berlin. Sauer currently serves as Principal Investigator and board member of Matters of Activity.

IGOR SAUER is Head of Experimental Surgery at Charité Hospital and Principle Investigator at Matters of Activity. He is an expert in the field of bio-artificial organs, decellularization and recellularization of organs, liver support devices, and transplantation. Furthermore, he conducts research and development in the field of mixed reality head-mounted displays for image-guided surgery and virtual reality simulation in surgical practice. Prof. Sauer is Principal Investigator at Matters of Activity.

MAXIE SCHNEIDER is an architectural design researcher. Her work combines physical and digital prototyping to develop new building techniques and material systems. She has collaborated on various design-build projects and advanced material experiments into structural implementation. As a Pre-Doctoral Researcher and Ph.D. candidate at Matters of Activity and TU Berlin, she investigates adaptive textile hybrid structures and aspects of the functionalization of softness in architecture. She teaches textiles in spatial context at wei.ensee kunsthochschule berlin.

JOSEPHINE SHONE is a textile and materials designer and researcher. She completed her BA in Textile and Surface Design at weißensee kunsthochschule berlin. Her projects research ways of converting waste into sustainable materials, combining traditional craft techniques and modern technologies to develop tools and techniques that reuse, repurpose and recycle. As an Assistant Researcher and experimental designer at Matters of Activity, she develops prototypes for novel materials and material systems for architectural applications.

ROBERT STOCK is Assistant Professor for Cultures of Knowledge at the Department of Cultural History and Theory at Humboldt-Universität zu Berlin and Principal Investigator at Matters of Activity. In 2017, he completed his Ph.D. with a dissertation about cultural decolonization processes and documentaries between Mozambique and Portugal. He is interested in situated knowledges, digital media, dis/abilities and access work and Luso-African decolonization processes. In his current work, he investigates epistemic practices, technologies and the unsettling futures of active trees.

MARIE WEINHART is a chemist specialized in polymer science. Since 2019 she is Professor for Polymer Chemistry at Leibniz Universität Hannover with a coaffiliation at Freie Universität Berlin focusing on research in the biomedical field. There, she is heading the Weinhart research group, working at the interface of polymer chemistry, surface science, cell biology and tissue engineering.

Architect ALEJANDRO WEISS received his Master's Degree in Urban Design with postgraduate studies in Innovation and Creativity through Design from the Catholic University of Chile. Weiss is a biodesigner centered on designing and implementing material systems using local biomass. Furthermore, Weiss has served as Co-founder and Director of LABVA.

CHARLETT WENIG is an interdisciplinary material and product designer. She is interested in waste materials with a current focus on barks of different tree species. In the Matters of Activity research group "Adaptive Fibrous Materials" at the Max Planck Institutefor Colloids and Interfaces, she explores potential fields of application, creating various design scenarios for bark use while considering her research findings on structure, properties, and functions.

IMPRINT

MATERIAL Legacies

DESIGN LAB #13,
3RD OF NOVEMBER 2022 – 26TH OF FEBRUARY 2023

Design Lab #13: Material Legacies is part of the Design Lab exhibition series at Kunstgewerbemuseum Berlin, that since 2019, has invited selected design studios, students, and researchers to present current projects and to engage in discourse with the collection of the Museum of Decorative Arts. The series is curated by Claudia Banz, curator for design at Kunstgewerbemuseum. It is supported by the Kuratorium Preußischer Kulturbesitz Berlin.

KUNSTGEWERBEMUSEUM
THE EXHIBITION SERIES “DESIGN LAB”

HUMBOLDT-UNIVERSITÄT ZU BERLIN
CLUSTER OF EXCELLENCE “MATTERS OF ACTIVITY. IMAGE SPACE MATERIAL”

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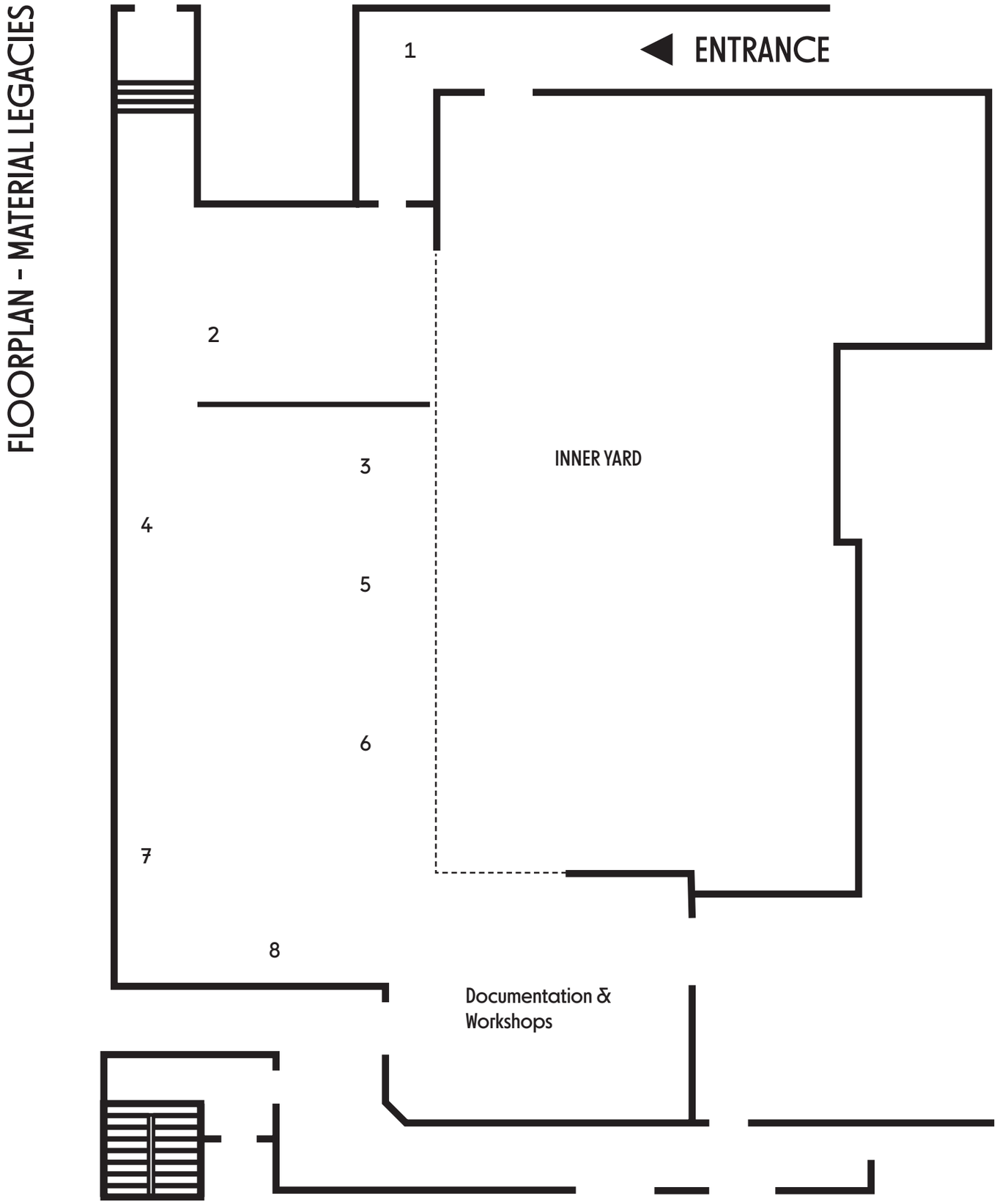
FLOORPLAN - MATERIAL LEGACIES



1 - RUBBER VIOLENCE Claudia Mareis, Helen Pinto, Emile de Visscher, Amanda Winberg ; 2 - ARCHITECTURAL YARNS - Iva Rešetar, Christiane Sauer, Maxie Schneider, Josephine Shone; 3 - THE BARK SPHERE Johanna Hehemeyer-Cürten, Robert Stock, Charlett Wenig; 4 - TESSELLATED MATERIAL SYSTEMS; Mason Dean, Karola Dierichs, Lennart Eigen, John Nyakatura, Felix Rasehorn; 5 - INFAUNA | A Biomaterial Culture; Valentina Aliaga, María José Besoain, Nicolas Hernandez, Heidi Jalkh, Alejandro Weiss; 6 - VASCULARIZATIONS; Emile De Visscher; 7 - SELF-SHAPING TEXTILES; Lorenzo Guiducci and Agata Kycia; 8 ASSEMBLING THE COAST Michaela Büsse, Andreas Kühne, Konstantin Mitrokhov.