NEURO_ECO_MEDIA

ART INSPIRED BY SCIENCE

by JILL SCOTT

WHAT IS NEURO_ECO_MEDIA?

NEURO_ECO_MEDIA is an innovative examination and exhibition of artworks – a retrospective from 20 years of creative research by Jill Scott and her team. It blends neurobiological anatomy, physiology, and media art. Here eight projects offer deep insights and unique interpretations into the processes of art and science production. They reveal how scientists investigate sensory perception and behaviour at the molecular, cellular and systems level. Each artwork looks at the cross modal interaction between the senses and features one sense above the others. Each one also focuses on our perception of particular environmental impacts. Together they demonstrate how interpretative forms of media art and metaphorical inspirations from science can demystify and abstract these perceptive complexities for diverse audiences.

Sensory perception lies at the heart of neuroscience, environmental science and art. This exhibition encourages know-how transfer about the subject of perception itself, cumulating in interactive subjective and immersive experiences for the participants. It is designed for audiences who are interested in art and science, therefore it can be shown in either context. Assisted by a catalogue, videos and images, NEURO_ECO_MEDIA provides the background for readers and attendees and suggests an alternative approach to scientific communication, one in which the metaphors and analogies can be shared. Each project not only helps the public understand neural and ecological complexities, but it encourages new social, cultural and educated "ways of seeing", thereby also adding to the field of visual culture.

THIS EXHIBITION FEATURES:

A / SEVEN INTERACTIVE SCULPTURES
Each one features one sense and is inspired by images from the scanning electron microscope.

B / DOCUMENTARY FILMS (15 minutes each)
In these films, filmmakers feature interviews with the scientists about their research, and follow Scott's artist-in-resident processes of production of these sculptures.

C / THE CATALOGUE
This catalogue provides a comprehensive written theoretical background about the art and science research from these eight artworks.

D / BACKLIT WINDOWS
The windows feature drawings and artistic interpretations by Jill Scott about how we perceive ourselves in relation to natural systems. They function to open-up discources about the effects of our environment on us as well as the human impact we have on our environment.

THE ELECTRIC RETINA (2008)

DERMALAND (2009)

SOMABOOK (2011)

ESKIN SCULPTURES (2002-2012)

AURALROOTS (2014)

JELLYEYES (2016)

AFTERTASTE (2021)

ESKIN PERFORMANCES (2018, 2019)

E / FILM DOCUMENTARIES
These two documentary films feature the ESKIN Performances. They show how visually challenged dancers in Basel and Durban were given the opportunity to express their feelings about the impacts of climate change on their own local environments. Each event was sponsored by some science research labs and art museums.

THIS WHOLE EXHIBITION IS AVAILABLE IN GERMAN

THE FIRST EXHIBITION OF FOUR NEUROMEDIA PROJECTS AT KULTURAMA, MUSEUM OF THE PEOPLE. ZURICH, SWITZERLAND (2012).

INSTALLATION REQUIREMENTS

SPACE REQUIREMENTS
Approximate floor size needed: 200 m^2
The ceiling height: 2.5 m
(must be able to hang projectors)

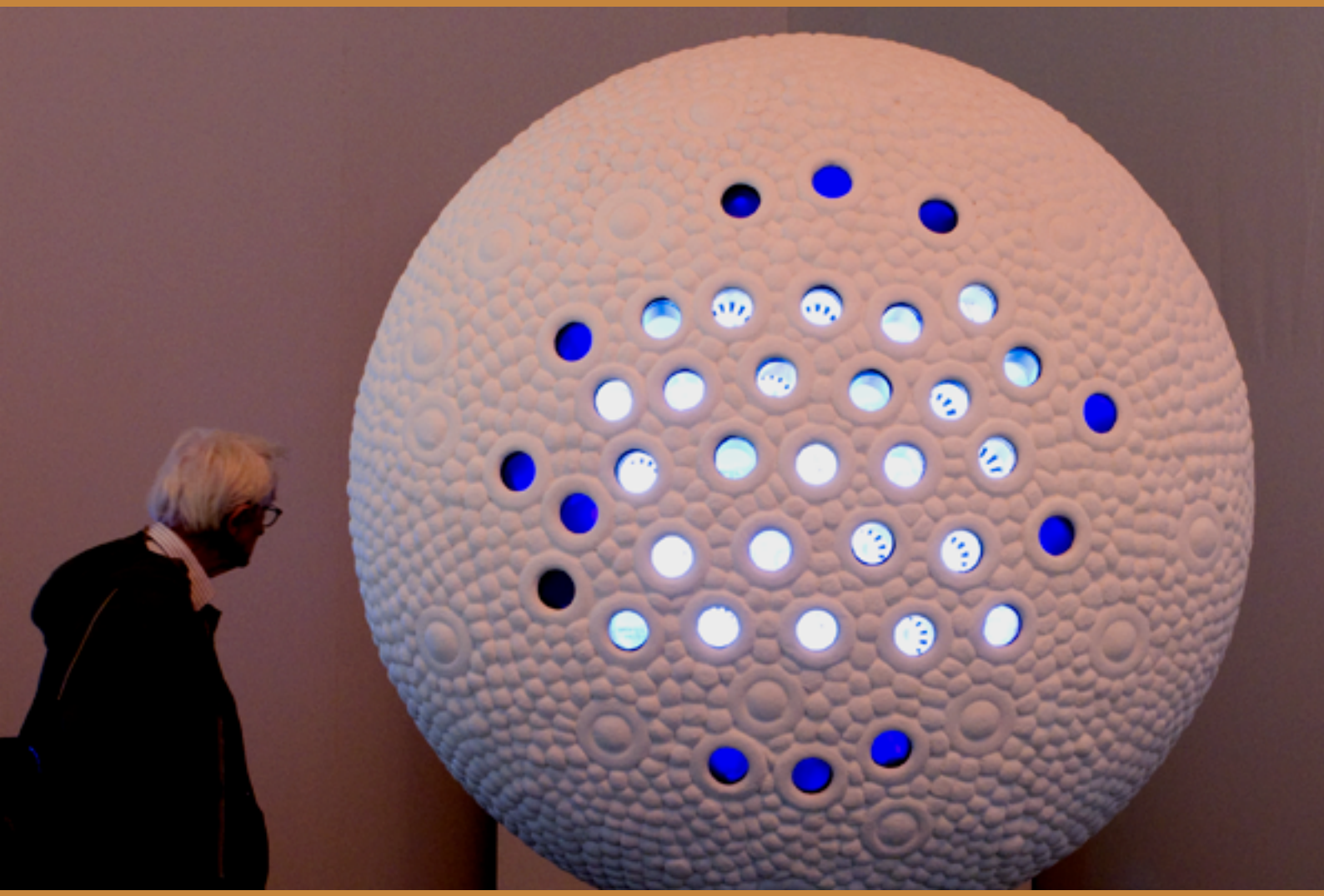
WHAT IS SUPPLIED?
NEURO_ECO_MEDIA comes with ALL THE MAIN EQUIPMENT SUPPLIED, including all the interactive parts of the exhibition, cables, computers etc. This includes a COMPLETE BACKUP of all computers (Mac-Minis) as well as all spare electronics and replacement parts.

MAINTENANCE
Eigth manuals are suplied for each project with instructive and easy to use steps. The exhibition is designed to run long hours and it is very robust with low technical maintenance. Repair costs are covered by the artist.

EXTRA EQUIPMENT NEEDED AND EXTRA COSTS
Transport and installation costs must be covered by the host, however transport costs might be covered by Pro Helvetia (The Swiss Arts Council).The host organization needs to provide some standard display equipment for the documentary films and 2 video projectors.

NEURO_ECO_MEDIA

by JILL SCOTT



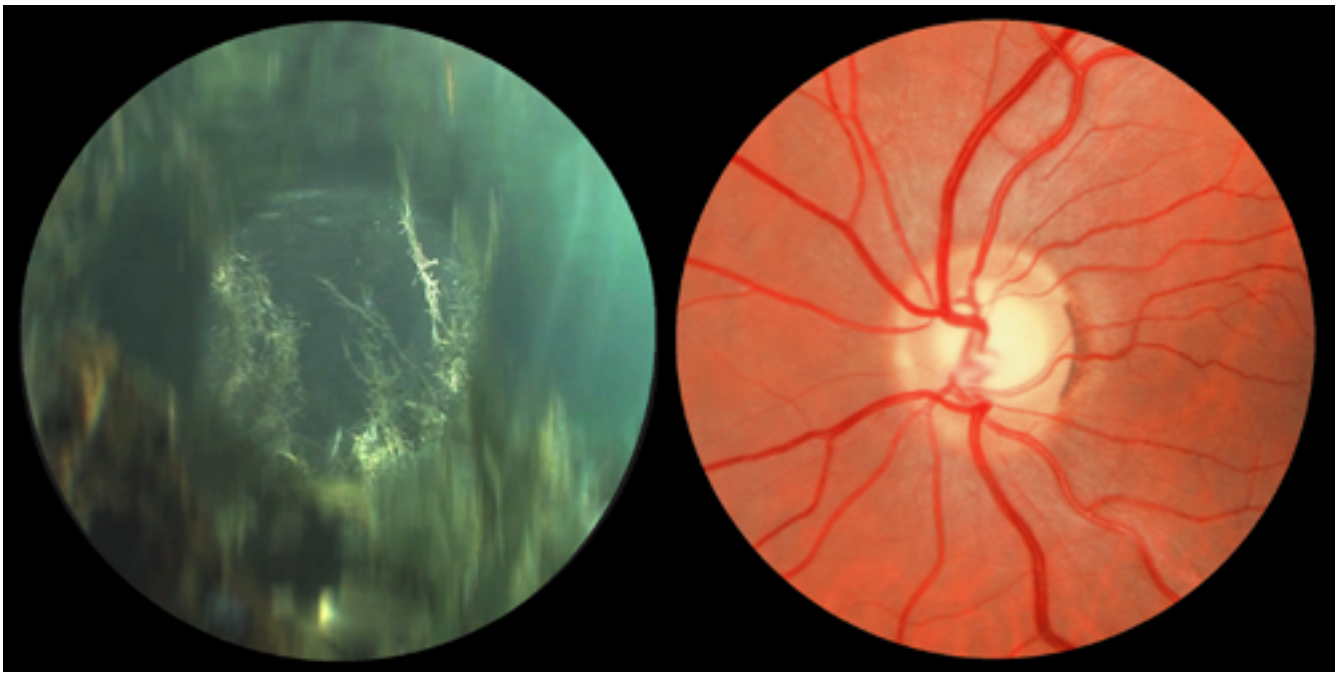
THE ELECTRIC RETINA (2008)

HEALTHY VISION

Stand “inside the brain” and look through the retinal photoreceptors. Explore visual impairment research through the eyes of a zebrafish.

THE ELECTRIC RETINA

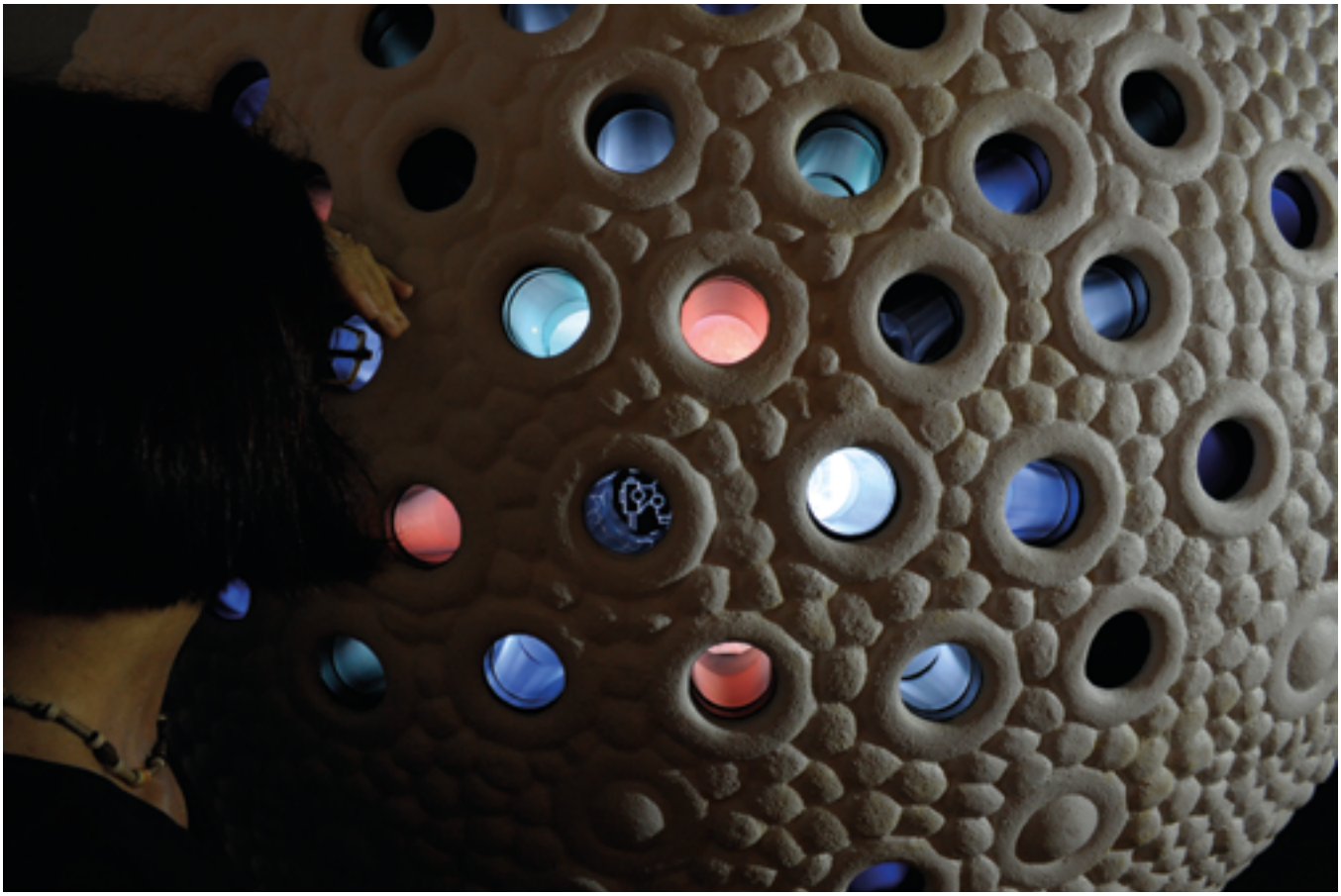
Our eye's retina is the place where our vision begins, where the process of seeing is converted into signals interpreted by our brain. The back of the ELECTRIC RETINA is exactly that: a large inside out eye resembling the rods and cones of the human retina. The frontside is like an eye with its iris and lens "looking" at projected underwater film loops. The ELECTRIC RETINA is an art and science stand-alone interactive sculpture almost 2 meters high. This interactive sculpture is inspired by scientific researchers who study our visual system: the eye, the optic nerve and the visual cortex in our brain. The viewer is "scaled down" to the similar size of the photoreceptors in the retina (five nanometers) and can peer into oculars embedded in the surface to see five eye diseases. The resultant perceptual behaviour of each disease is revealed in film loops taken from the perspective of mutant zebrafish which are researched in neuroscience. The ELECTRIC RETINA aims to explore the relationship between our own visual perception and this scientific research. It is about the act of seeing and the audience can investigate the interdependent complexity between our eye and our brain.



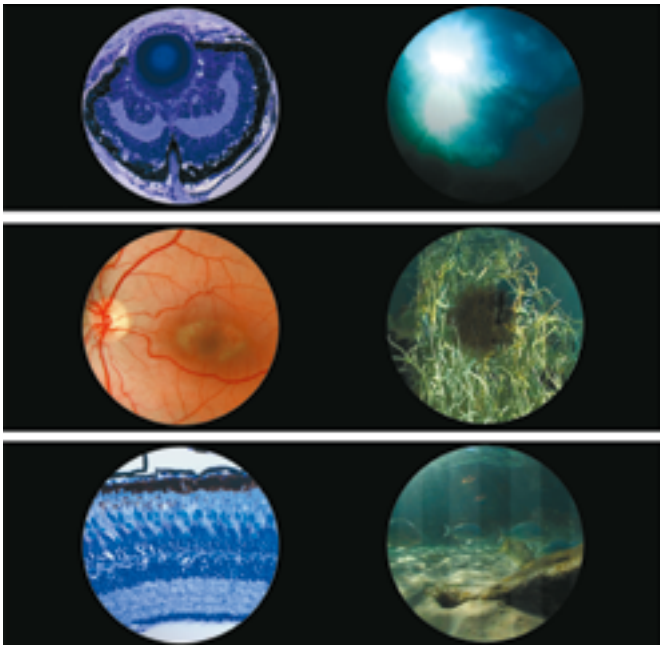
ARTISTIC IMPRESSION OF THE DISEASE: GLAUCOMA. (LEFT) BLURRED PERIPHERAL VISION. (RIGHT) THE SQUASHED OPTICAL DISC.

THE IDEA BEHIND THE ELECTRIC RETINA

Neuroscientists study zebrafish to conduct research diseases of the human eye. Your eyes are the eyes of a fish! But our cultural and experiential influences contribute to a different way of seeing. How is it possible to diagnose the workings of the eyes of such a small zebrafish? The ELECTRIC RETINA is an attempt to become a catalyst by using underwater photography to mimic and interpret the behaviour of the fish that are studied in the lab. Understanding how visual perception works has fascinated artists throughout the ages. It seems that both fields of research, visual art and neuroscience lack knowledge of each other's research even though they are both extremly focused on the visual system. Such interpretations inspire the viewer to reflect about their own sense of vision and encourage cross modal connections between their own tactile and visual perceptions while interacting with the ELECTRIC RETINA. In neuroscience as in art, investigations have often questioned the relationship between what we see and what we know. This research includes how the hard-wired visceral link between the retina and the visual cortex of the brain relates to how humans make creative decisions.

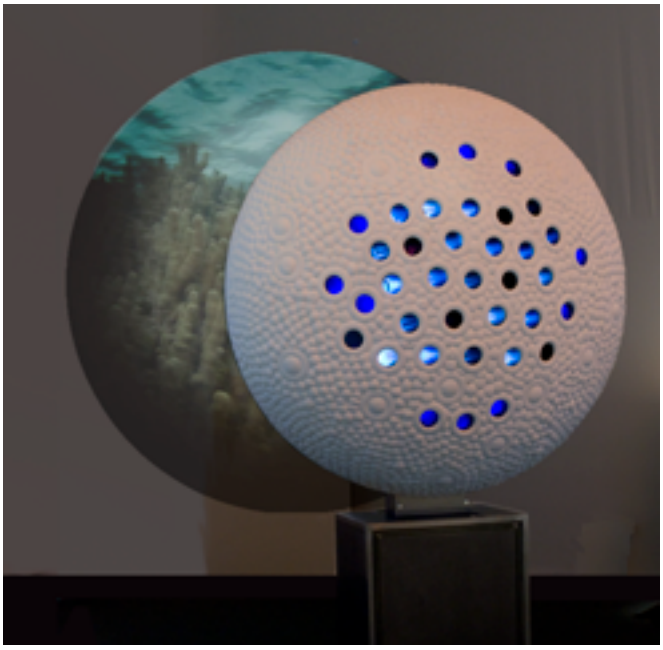


A VIEWER LOOKS THROUGH THE OCULARS OF THE ELECTRIC RETINA AND TRIGGERS PROXIMITY SENSORS THAT SHOW IMAGES AND PLAY SOUNDS FROM VISION RESEARCH. THE OCULARS ARE EMBEDDED IN THE INSIDE OUT RETINAL SURFACE OF RODS AND CONES.



LEFT /
IMAGES FROM RESEARCH IN VISUAL SYSTEMS.

RIGHT /
CORRESPONDING VISION WITH RELATED PROBLEMS.



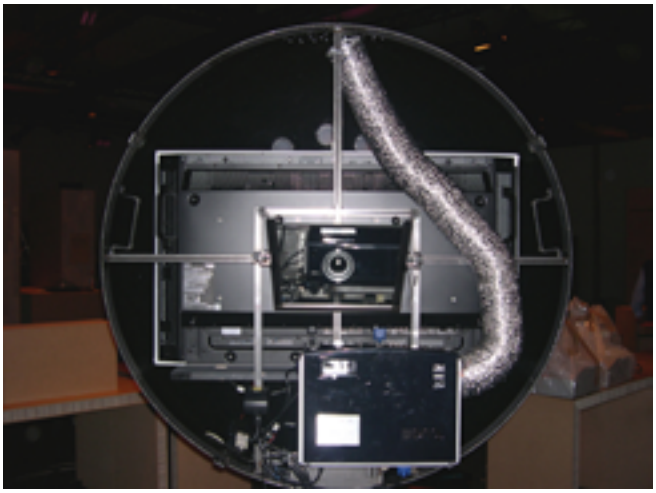
THE ELECTRIC RETINA PROJECTS THE EFFECTS ON VISION OF FIVE DIFFERENT EYE DISEASES INSIDE AN AQUATIC ENVIRONMENT.

ART INSPIRED BY THE VISUAL SYSTEM

Jill Scott's own diagnosis of Glaucoma stirred her desire to study the effects of eye diseases, genetics and degeneration on visual perception. The ELECTRIC RETINA also features four other well-known eye diseases: Ushers Syndrome, Macular Degeneration, Fish Noir and Retinosa Pigmentosa. Glaucoma is a disease resulting in the insufficient production of aqueous fluid, which circulates essential nutrients for the health of the optic nerves. When the shape of the optical disc is permanently crushed the axons of the optic nerve in the eye's fundus lead to a blurring of peripheral vision. Ushers Syndrome is a genetic disorder that leads to blindness and deafness. Macular Degeneration is a disease that happens often with age, whereby the macular at the back of the eye becomes detached. This causes a dark spot to appear in one's vision. Fish Noir is a disease that can be prevented by a proper diet fortified with vitamin A and fatty acids, and it can be found in many developing countries. Retinosa Pigmentosa is a disease of the retina itself, whereby the pigment in the photoreceptor degenerates to cause disturbing light refraction. In the ELECTRIC RETINA artwork, underwater film narratives have been created to correspond to data gathered by the neuroscientists in their labs.

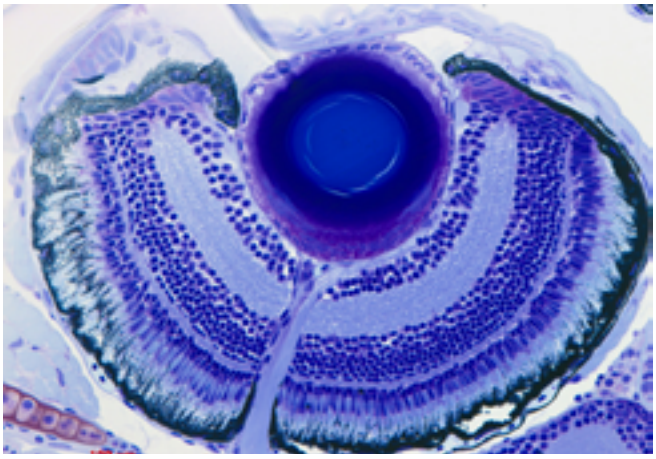
THE INTERACTIVE EXPERIENCE

In the ELECTRIC RETINA, the viewers become participants who can explore the relationships between metaphorical (front side) and functional (back side) elements. The front of the sculpture projects underwater film loops through a lens and the viewers can turn its lens ring to trigger other film loops. These show the interpretations of what a fish might see with a certain eye disease. When the viewer investigates the oculars, they trigger proximity sensors. This action causes animations from the science research lab related to the projected underwater film loops on the wall in the front of the sculpture. It is as if the viewer is standing inside the brain to look through the photo-receptors into the neural chemical layers of the retina. These related two-sided interactions with the sculpture are designed to create an immersive and discursive experience for more than one viewer. This interaction encourages onsite discussions between the audience members who tend to compare their own visions and interpretations of what they do or do not see in their visual experiences.



INTERIOR STRUCTURE OF THE ELECTRIC RETINA.

BACK OF SCULPTURE - INTERFACE 1: LOOKING THROUGH THE OCULARS TRIGGERS INFORMATION FROM SCIENTIFIC RESEARCH.



THE ZEBRAFISH RETINA IS THE SAME STRUCTURE AS THE HUMAN EYE RETINA.

FRONT OF SCULPTURE - INTERFACE 2: TURNING THE LENS RING CAUSES THE FIVE DIFFERENT FILMS ABOUT EYE DISEASES.

JILL SCOTT'S IRIS, UNIVERSITY OF ZURICH.

CREDITS

PRODUCTION CREDITS

ARTIST & DIRECTOR Jill Scott
PROGRAMMING & SENSORING Andreas Schiffler
• Marcus Dusseiller • Nikolaus Völzow
CONSTRUCTION HELP Simone Lüling • Beat Schlaepfer
• Christian Tanner

DOCUMENTARY FILM CREDITS

"THE ELECTRIC RETINA" (15 mins):
CAMERA Christian Tanner
EDIT Anet Nyffeler
PRODUCED BY Anetmedia GmbH

PARTNERS

Prof. Dr. Stephan Neuhauss, Neurobiology, Institute of Molecular Life Sciences, University of Zurich, Switzerland

SCIENTIFIC CONSULTANTS

Oliver Biehlmaier • Marion Haug • Corinne Hodel • Melody Huang • Colette Maurer • Markus Tschopp (Neuroscientists at the University of Zurich)

EXHIBITION HISTORY

2014 | The Düsseldorf Quadriennale. THE ELECTRIC RETINA. IMAI. NRW Forum. Düsseldorf, Germany
2013-2014 | Neuromedia. THE ELECTRIC RETINA. INTECH Science Center: Winchester Science Center. UK
2013 | NEUROMEDIA. Kulturama Museum des Menschen. Zurich, Switzerland
2009 | Super Human. THE ELECTRIC RETINA. RMIT Gallery; curated by ANAT, Melbourne, Australia
2008 | Parcours des Wissens - 175 years of the University of Zurich. THE ELECTRIC RETINA. The Brain Fair. University of Zurich

LINKS

www.jillscott.org

FUNDING

Life Sciences Zurich, Brain Fair, University of Zurich

CONTACT DETAILS FOR THE NEURO_ECO_MEDIA SERIES

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Bundesamt für Kultur BAK

Universität Zürich[UZH]

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DERMALAND (2009)

SKIN AND THE ENVIRONMENT

Use a magnifying glass to explore global warming effects on our skin and our soil, accompanied by two roaming robots.

DERMALAND

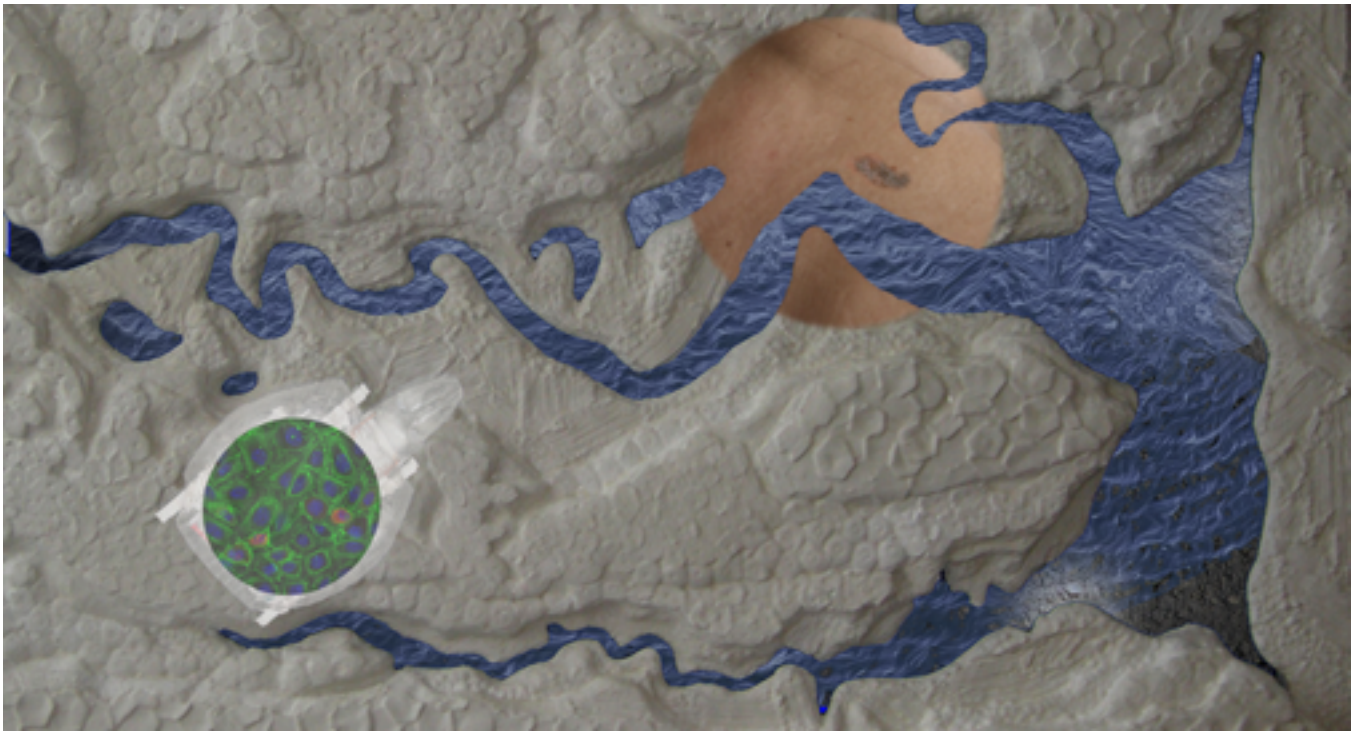
DERMALAND consists of two changing interactive landscapes of skin and soil which blend from one into the other over time. The media installation is set into a lower table to allow both, adults, and children to discover the slowly transforming projections from above as well as from below the surface. Here, they can listen to the different sound compositions over time. The landscape of DERMALAND is inspired by the amazing Scanning Electronic Microscope images of the dermal and epidermal layers in human skin specimen as well as research into the fragile ecosystem of the South Alligator River in Kakadu National Park in Northern Australia. This ecosystem suffers from heatwaves and soil degeneration caused by climate change. Currently, both, the neural layers of our human skin and the surface of the land are deeply affected by an increase from sun exposure and global warming. The projected images reveal how UVA and UVB radiation effects the health of our human skin and the soil of our landscape at the same time. The viewers use interactive magnifying glasses to traverse over the sculptural surface which allow them to "see" even more clearly the damages on the two landscapes or "skins". In addition, two robots wander around the surface and look as if they are eating dead skin and soil cells. They are based on enlarged dust mites or soil weevils. Half land/ half derma skin, DERMALAND is a poetic metaphor that has been inspired by scientific and environmental research. The artwork raises awareness by making an analogy about the "care of skin" and the "care of our environment" within this "embodied" environmental drama.

CHILDREN PLAY WITH DERMALAND TO EXPLORE THE EFFECTS OF UV RADIATION ON THE SKIN AND ON THE SOIL.

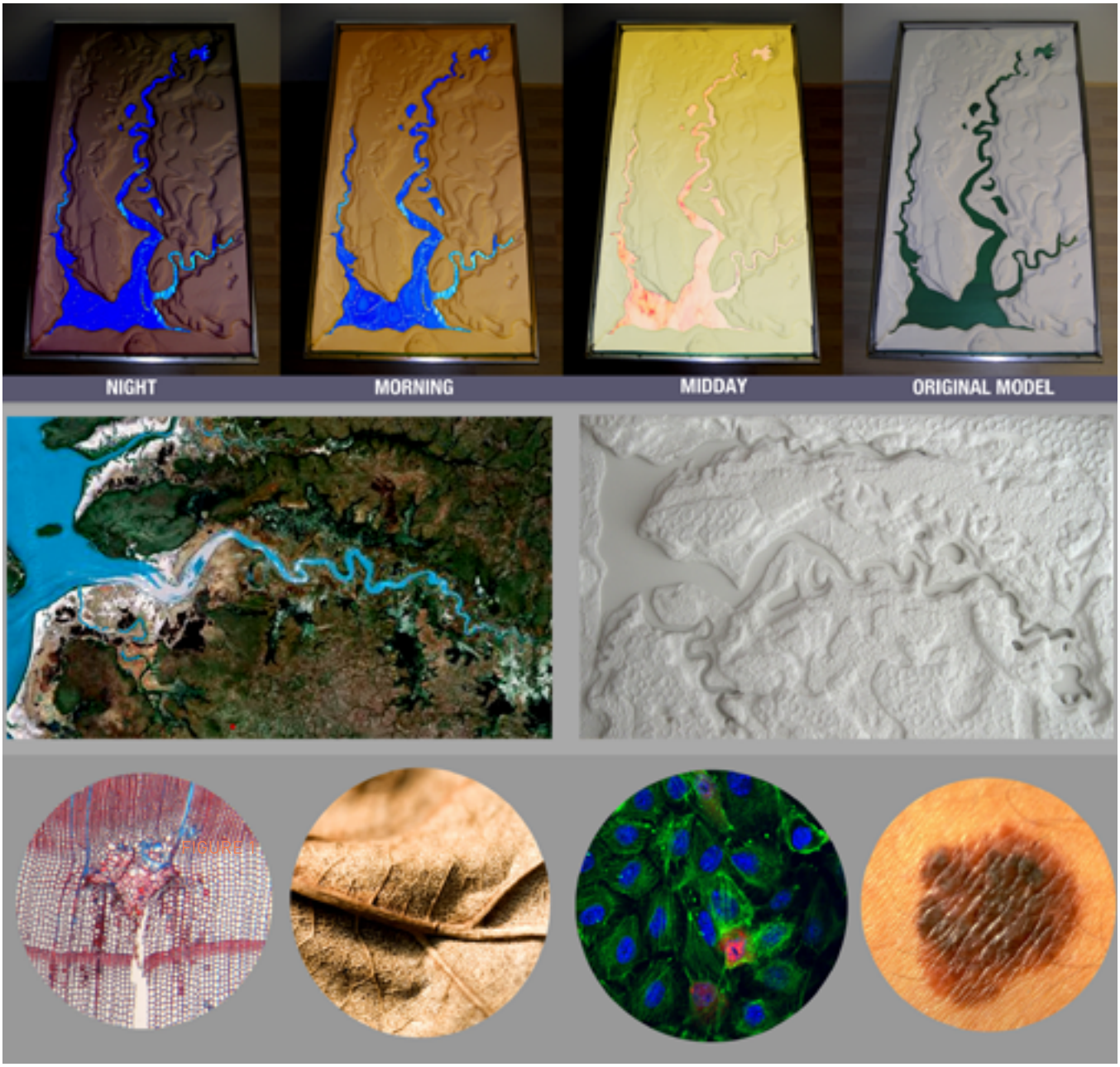
THE IDEA BEHIND DERMALAND

Your skin is the primary interface between your body's interior and your environment; just as the soil of our planet is the interface between the earth's center and the life on its surface! Therefore, skin is a landscape! Can we raise public awareness by combining the care of skin with the care of our environment? The aim is to create cognitive associations, which may in turn help the public to understand more about the somatic behaviour of the Dermatome. On top of this skin-scape, the viewer can trigger cellular and molecular images generated by light microscopy as well as micro images about moisture levels of soil. They can also see body parts which show the effects of UV radiation on exposed human skin. This same UVA damage is causing sandstorms due to the drying out of the topsoil which resettles on the landscape and suffocates plants. It also kills weevils who are important for healthy soil maintenance. Weevils and dust mites belong to the family of eight-legged creatures called arachnids and they live off dry human skin and dead matter in warm, humid places. However, dust mites' populations die in high levels of UV radiation. Such ecological and neuroscience information helped to inform the content of DERMALAND.

ROBOT AND THE MAGNIFYING GLASS INTERFACE



PROJECTIONS THAT APPEAR ON THE SCULPTURAL SURFACE: CHANGING FROM NIGHT TO DAY AND FROM SOIL TO SKIN.



(TOP) SIMULATION PROJECTED ON THE SURFACE THAT CHANGES FROM DAY TO NIGHT AND BACK: THE RIVER TURNS INTO BLOOD VESSELS. (MIDDLE) THE MAIN LANDSCAPES OF SOIL AND SKIN. (BOTTOM LEFT) EFFECTS OF UV RADIATION ON THE SOIL AROUND THE ALIGATOR RIVER IN KAKADU NATIONAL PARK, AUSTRALIA. (BOTTOM RIGHT) CANCEROUS CELLS THAT FORM BECAUSE OF UVA DAMAGE IN THE HUMAN SKIN.

ART INSPIRED BY NEUROSCIENCE, DERMATOLOGY AND SOIL SCIENCE

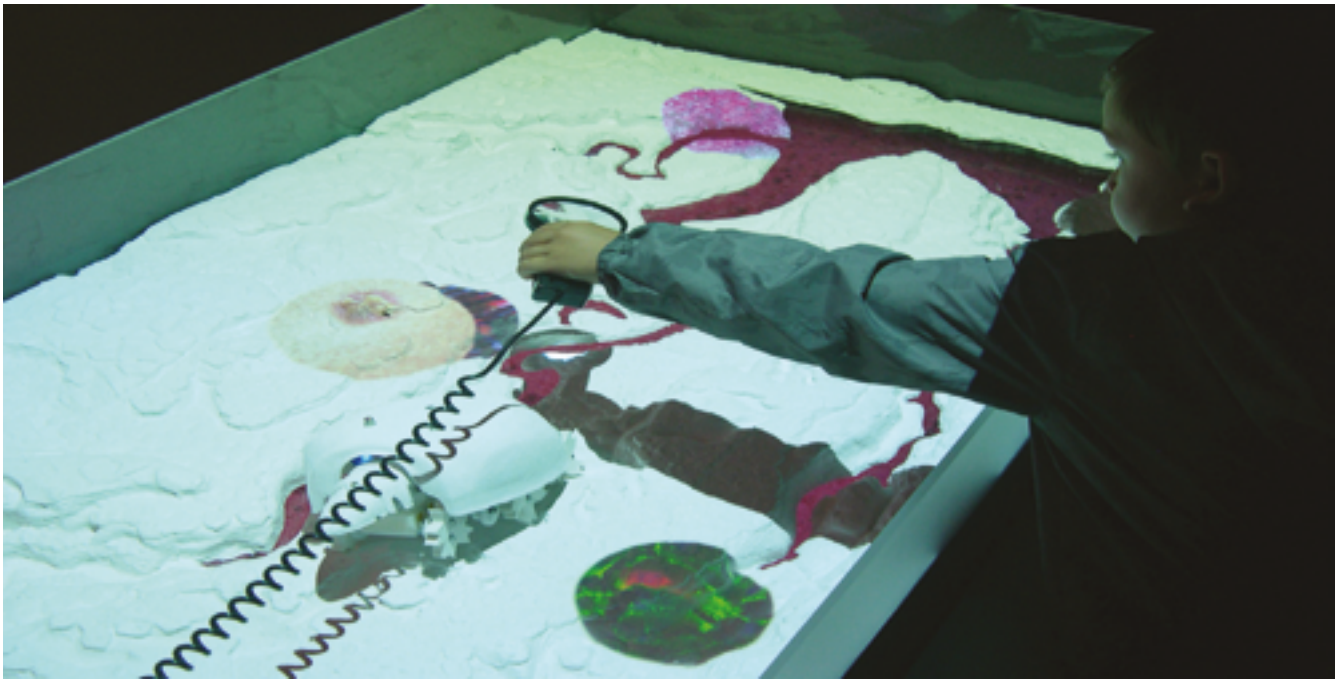
This project was inspired by studies in skin cancer from residencies in dermatology and neuroscience as well as the experience of visiting desert ecologies in Australia and talking to environmental scientists. The dermatome is a neurological term used to describe the cervical part of the spinal column and the efferent and afferent processes, which directly relate to the dermal and epidermal skin layers on the back of head, legs, neck, and arms. The 3D surface of DERMALAND has been inspired by images of the epidermis and dermis segments of the human skin that have been captured by the Scanning Electronic Microscope. Although just 1-2 mm thick, the human skin covers an area of 1,8 square meters and weighs 4-5 kg. It comprises more that 100 billion cells and within a square centimeter of it, one can find 120 sweat glands and 15 tallow glands. All skin cells are actively fed by nutrients flowing through 240 km of capillaries. According to the dermatologists, standard UV radiations like UVA produce the potentials for the development of skin cancer. According to the soil ecologists, Kakadu landscape in Australia is currently under-going destructive changes from UVA damage and unpredictable dry weather patterns.

THE INTERACTIVE EXPERIENCE

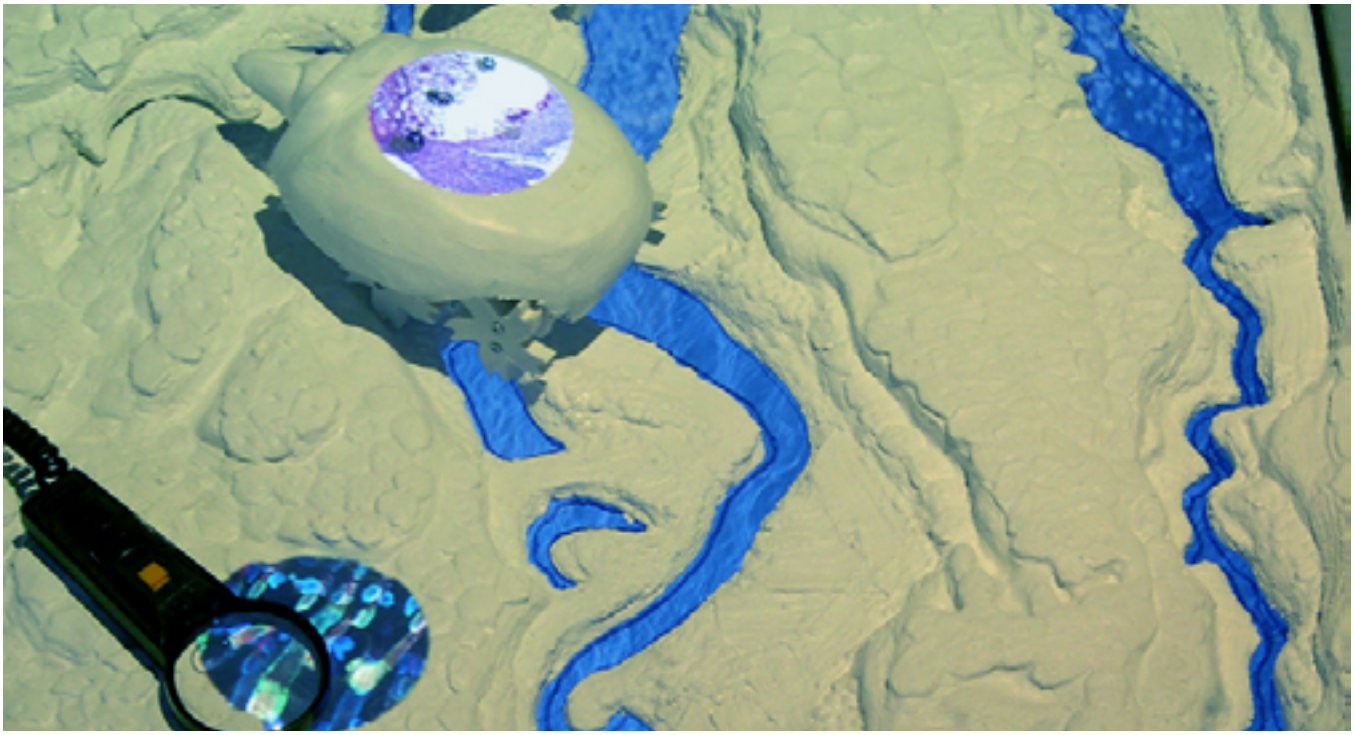
The viewers use magnifying glasses to investigate the layers beneath the skin of the landscape creating a parallel metaphor between the human skin and the skin of the planet. These include enlargements of special sections of the landscape surface or associative effects on skin tissue as well as the condition of the landscape`s foliage. The skin images are derived from molecular and cellular mechanisms of tissue repair with particular emphasis on the molecular mechanisms behind dermatitis and apoptosis in response to UV irradiation and the effects of radiation exposure on the skin's basal cells.

There are two robots – based on the behaviour of dust mites and weevils, which roam over the surface and trigger audio visual displays. In DERMALAND, these two roaming robots appear to graze on the landscapes.

THE ROBOTS IN DERMALAND MOULDED ON DUSTMITES/WEEVILS AND BUILT USING OPTICAL AVOIDANCE DIY 2WD ARDUINO KITS.



MAIN INTERFACE: MAGNIFYING GLASSES USED BY THE AUDIENCE TO TRIGGER ANIMATIONS IN CIRCULAR SHAPES. THE ANIMATIONS ARE INSPIRED BY MICROSCOPIC RESEARCH ABOUT SKIN DAMAGE OR CHANGES IN THE SOIL.



THE ROBOTS OF DERMALAND: BASED ON THE FORM AND BEHAVIOUR OF DUSTMITES AND WEEVILS.

CREDITS

PRODUCTION CREDITS

ARTIST & DIRECTOR Jill Scott
ROBOTS Marc Ziegler (Artificial Intelligence Lab, University of Zurich)
PROGRAMMING Nikolaus Völzow • Roman Haefeli
TRACKING Wim Ton
VISUAL EFFECTS Phillippe Kipper • Christian Tanner • Andrew Quinn
SUPPORT Marille Hahne • Juanita Schlaepfer-Miller

DOCUMENTARY FILM CREDITS

"DERMALAND" (20 mins):
CAMERA Andreas Birkle
EDIT Annette Brütsch
PRODUCTION Marille Hahne (Zurich University of the Arts)

PARTNERS

Artificial Intelligence Lab at The University of Zurich (robots)

SCIENTIFIC CONSULTANTS

Prof. Reinhard Dummer (Clinic Director, Dermatology Clinic, University Hospital, Zurich)
Dr. Roger Wepf (EMEZ, Electron Microscopy Center at the ETHZ Federal Institute of Technology Zurich, Switzerland)
The Light Microscopy Centre at the ETHZ Zurich, Switzerland
Dr. Norbert Kräuchi (Head Landscape and Waters Devision, Swiss Federal Institute for Forest, Snow and Landscape, WSL Birmensdorf, Switzerland)

EXHIBITION HISTORY

2013-2014 | NEUROMEDIA. INTECH Science Center: Winchester Science Center. UK
2013 | NEUROMEDIA, Kulturama Museum des Menschen. Zurich Switzerland
2010 | DERMALAND. Cosmocixa, Science Museum Barcelona, Spain
2009 | ROBOTS: FROM MOTION TO EMOTION. Museum of Design. Zurich, Switzerland

LINKS

www.jillscott.org

FUNDING

Museum of Design. Zurich, Switzerland
Artificial Intelligence Lab at the University of Zurich (robots)

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Universität Zürich[UZH]

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SOMABOOK (2012)

DEVELOPING SOMATIC MAPS

Explore the neural development of “Touch”, “Texture”, “Shape and Size”, “Stretch”, “Translation” and “Correlation”.

SOMABOOK: DEVELOPING SOMATIC MOVEMENT

SOMABOOK is an art and science sculpture that is modelled on a cut through the neural tube of a human spinal cord. The sculpture has the metaphor of an open book whose pages reveal representational maps of the somatic cortex in the brain. The viewer's interaction combines audio-visual metaphors from scientific data with interpretations by a dancer about neural circuit formation. SOMABOOK aims to show the development of somatic sensory information. The viewers use their own tactile perception to compare inappropriate connections of axons. The results trace the loss of functions of molecular activity in diseases when the axon pathways have been misguided. SOMABOOK is a reminder that our nerves grow like a blind person's hand searching for the correct signals from different molecules and how these molecules affect growth patterns, movement, and coordination. This complex activity and its signs are depicted as a personal voice spoken by a set of real characters: the attractors, the repellers, the helpers, the inhibitors, and the family connectors. Other audio tracks help the viewer to understand how our sensory mapping systems and the somatic cortex, that forms in our brain, are very fragile ecosystems.

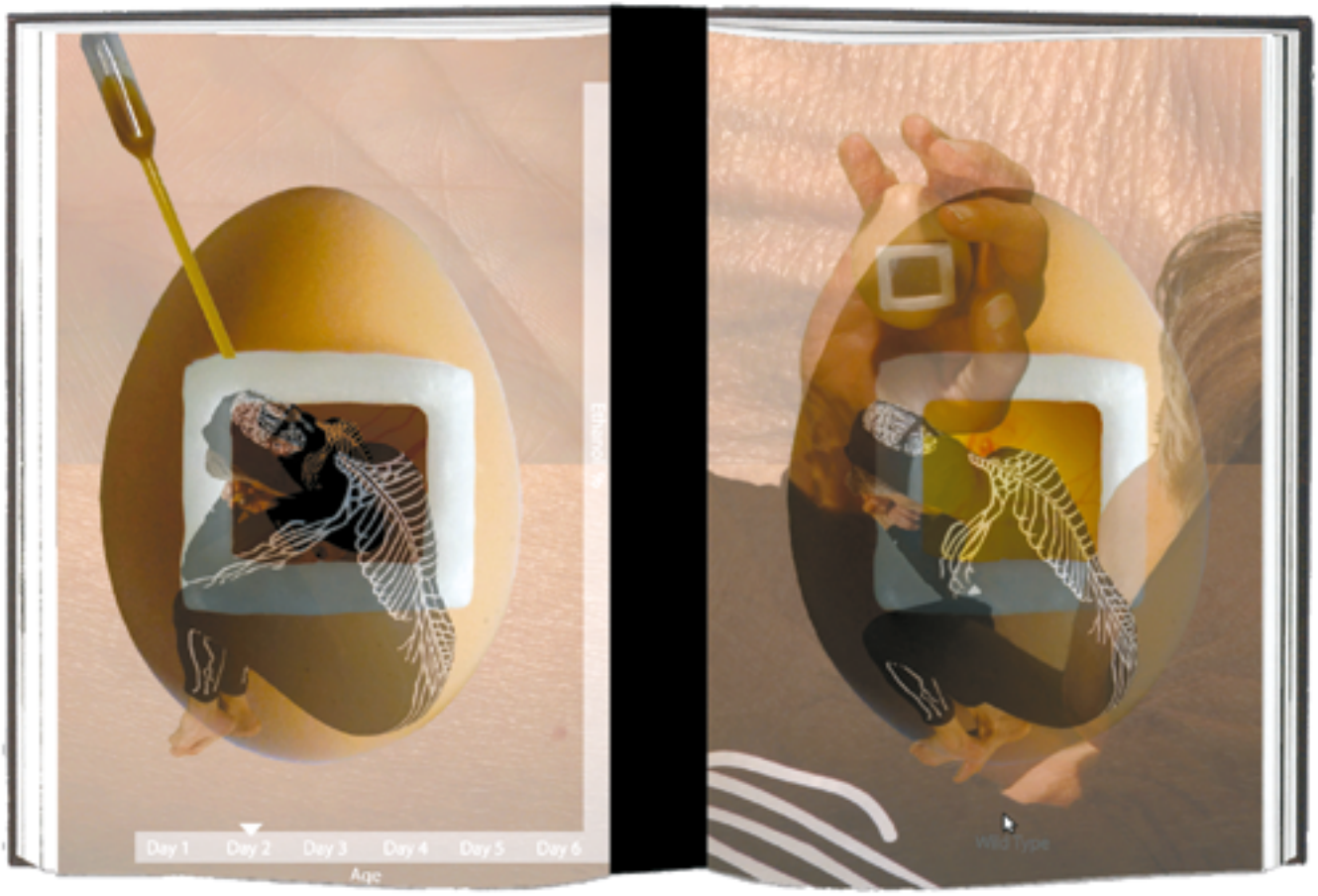
THE SOMABOOK SCULPTURE: A CUT THROUGH THE NEURAL TUBE IN THE HUMAN SPINE WITH TWO TOUCH SCREENS LIKE AN OPEN BOOK.

THE IDEA BEHIND SOMABOOK

In our bodies, touch and movement are connected because our neurons are coded to grow into complex neural circuits. The relation between these sensors has been explored in the techniques of modern dance that are based on contraction, release, recovery, energy, gravity, weight, rebound, suspension, and recovery. In other forms of dance improvisation, bodily tension is minimized to search for fluidity, clarity and the efficient use of breath and energy. The relationships between movement and the health of the brain have been confirmed by neuroscientists. In SOMABOOK, the dancer's improvisation relies on her recognition of texture, shape and size, the ability to stretch and how she translates and correlates her actions. These somatic networks are responsible for fluid movement, weight exchange and tactility. In neuroscience, certain molecules offer similar abilities as they guide movements of the axons from the neural tube to their correct destinations. The aim of SOMABOOK is to explore how haptic potentials relate to somatic networks by giving the viewer access to content through the act of touch. This sculpture represents the strength of the nerve cells and offers the viewer an interpretative experience of neural development.

In the somatic cortex, representational maps process and recognize sensory stimulations. These are texture, the shape and size of objects, the stretching motions of our body, pressure, and vibration on our skin and finally, the cooperation between the left- and right-hand sides of our bodies. While some axons fail to arrive at their genetically determined destinations, others may also fail to ascend to the somatic cortex. The result may cause problems in movement and brain function. Research into these problems became the starting point for the production of the SOMABOOK sculpture.

CONVERSTATIONS HAPPENING AROUND THE INTERACTIONS WITH SOMABOOK. NEUROMEDIA. EXHIBITION AT KULTURAMA, ZURICH. (2013).



LEFT /
SIMULATION OF ADDING ALCOHOL TO THE EMBRYO.

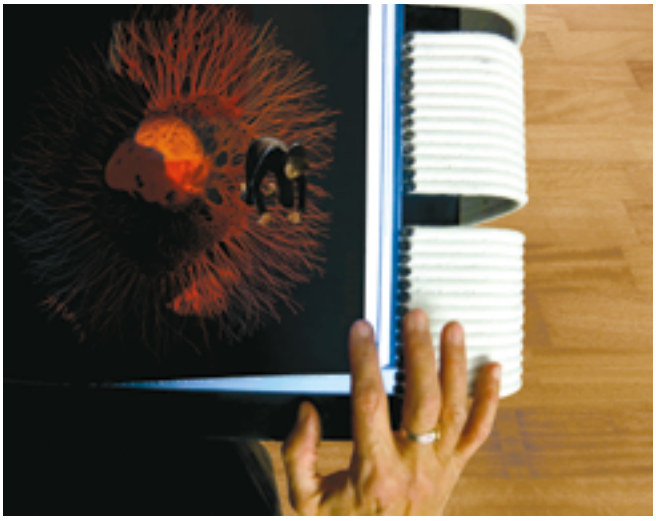
RIGHT /
A DANCER'S INTERPRETATION OF FOETAL ALCOHOL SYNDROME.

ART INSPIRED BY NEURAL DEVELOPMENT AND DISABILITY

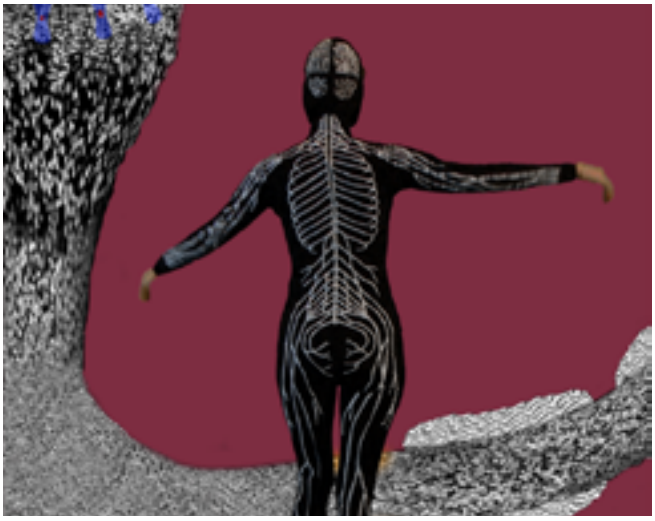
SOMABOOK invites people to explore the complexity of neural development by literally touching simulations of it. Because art is a visceral and tactile activity, artists like dancers can benefit from a basic understanding of how neural systems work and the effects of impairments on our ability to grow and move in a healthy body. Within five chapters, a dancer interprets how normal growth is essential for movement and balance and abnormal growth can cause disabilities like Spina Bifida or Cerebral Blastoma. In one chapter, the viewer can add alcohol to mimic what happens under the effect of "Foetal Alcohol Syndrome", a problem that can occur when a pregnant mother drinks too much alcohol. In neuroscience, chicken embryos are used to understand how neural axons can be misguided and cause problems relevant for human development. An axon is a long protrusion of a neural cell that serves as an information transmitter. In SOMABOOOK, the viewer can use sensor strips to explore how these axons grow. During growth, axons must find their way to correct locations in the body so that they can form neural circuits: the building blocks of our nervous system. Developmental problems in the somatic cortex cause cognitive, sensory and emotional difficulties. The cortex houses representational maps that effect the way we feel and identify inputs from our bodies' surface. SOMABOOK is a interpretative art and science work that encourages post reflection about the growth of our bodies.

THE INTERACTIVE EXPERIENCE

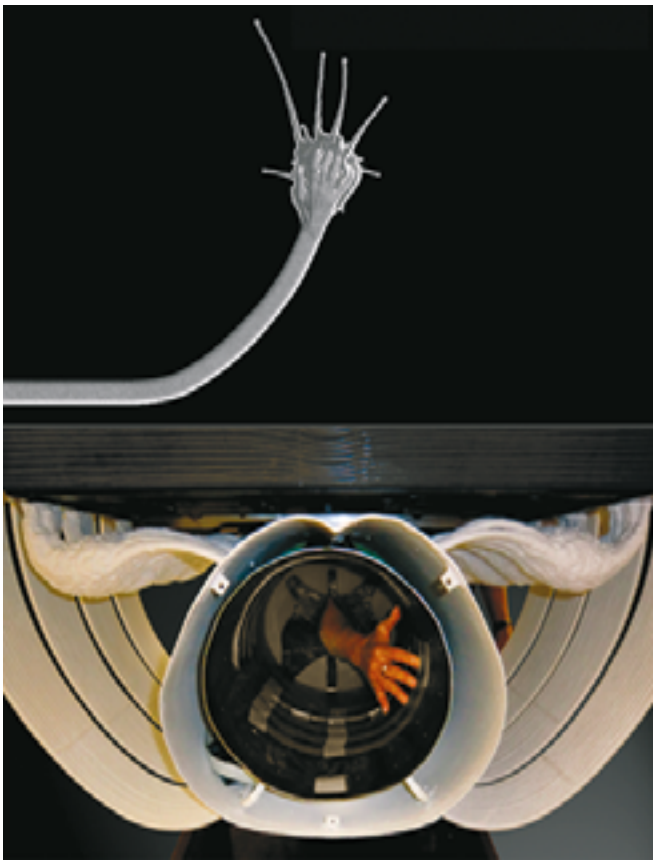
In SOMABOOK, the viewers can use two touch screens that resemble the floor plate of the neural tube and "the open book method of dissection" used in neuroscience. By using the touch screens, they can explore five chapters and hear stories about how specific cells are responsible for particular roles when the neural system is being developed in the human embryo. The floor plate is mounted on top of the real 3D shape of the neural tube of the human spine. When the viewer places his or her hand inside this tube, he or she can touch sensor strips. By scraping along these sensor strips, the viewer can cause axons to grow across the floor plate on the screens. These two forms of human computer interaction are designed to immerse the viewers in a drama of sensory discovery and curious investigations.



INTERFACE 1: TOUCH SCREEN TO CHOOSE THE SOMATIC CHAPTERS.



A DANCER TRACES NERVE SYNAPSES IN THE CHAPTER "TRANSLATION"



INTERFACE 2: SENSOR STRIPS ALONG THE INSIDE OF THE NEURAL TUBE CAUSES NERVE-AXONS TO GROW ON THE SCREENS.

THE SOMATIC BOOK IS PROJECTED ON THE WALL FOR MAXIMUM VIEWING.

TOP LEFT TO BOTTOM RIGHT /
EXAMPLES FROM SOMATIC MAPPING: 1. SHAPE AND SIZE, 2. TRANSLATION, 3. STRETCH, 4. COOPERATION.

CREDITS

PRODUCTION CREDITS

ARTIST & DIRECTOR Jill Scott
DANCER Meret Schlegel
CAMERA Christine Munz
PROGRAMMING Nikolaus Völzow
VISUAL EFFECTS Philippe Kipper • Annette Brütsch • Andrew Quinn
METALL CONSTRUCTION Beat Schlaepfer
SUPPORT Marille Hahne • Corinne Hodel

DOCUMENTARY FILM CREDITS

"SOMABOOK" (15 min):
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MONTAGE Annette Brütsch
PRODUCTION Marille Hahne (Zurich University of the Arts)

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Developmental Neuroscience, Institute of Molecular Life Sciences, University of Zurich

EXHIBITION HISTORY

2014 | The Pratt Manhattan Gallery. "Sleuthing the Mind", New York, USA
2013 | Kulturama Museum des Menschen. "Neuromedia", Zurich Switzerland
2012 | The Swiss Neuroscience Conference. University of Zurich. Irchel, Switzerland

LINKS

www.jillscott.org

FUNDING

Sitemapping, The Swiss Federal Office of Culture BAK, Switzerland

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Universität Zürich[UZH]

NEURO_ECO_MEDIA

by JILL SCOTT

ESKIN (2004-2016) SCUPTURES

INTERFACE WORKSHOPS

Testing skin response through the mimicking of our human skin's percepts of pressure, temperature, vibration and proprioception.

ESKIN SCULPTURES

Our skin is the largest organ of the human body for orientation, navigation and communication. The main aims of the ESKIN were to investigate the potentials of an interface based on skin to substitute vision. The results include three parts. The first is a video of a navigation and orientation workshop with visually challenged people and it contains valuable research about sensory perception. The second is a set of interactive sculptures called “smart sculptures” based on the microscopic surface of the human epidermis and dermis. This interactive component is extended by visual information and sounds based on the cultural and mythical significance of skin. The final part is a new wearable arm band designed for communication and navigation in different environments. The aim of the exhibition of these three components is to reawaken the viewers awareness of how pressure, vibration, temperature, and proprioception works, and to explore the potentials of tactility, through associated sound and graphics.

THE ESKIN SMART SCULPTURES: EMBEDDED WITH VIBRATION, TEMPERATURE, PRESSURE AND GYRO SENSORS THAT MIMIC TOUCH.

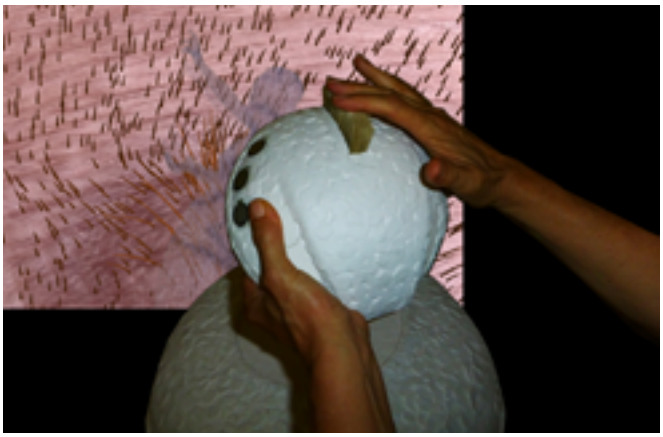
THE IDEA BEHIND THE ESKIN SCULPTURES

The ideas for the ESKIN interfaces developed in three stages and all were based on the sensory perception of skin.

1 / Workshop with the Visually Challenged
A one-month workshop was conducted with six visually challenged people from the Home for the Blind in Zurich, Switzerland. These participants rely on tactile and sound information for navigation in space and over time. Here new improvisation, movement, navigation and tactile exercises were developed and assessed to build new interfaces.

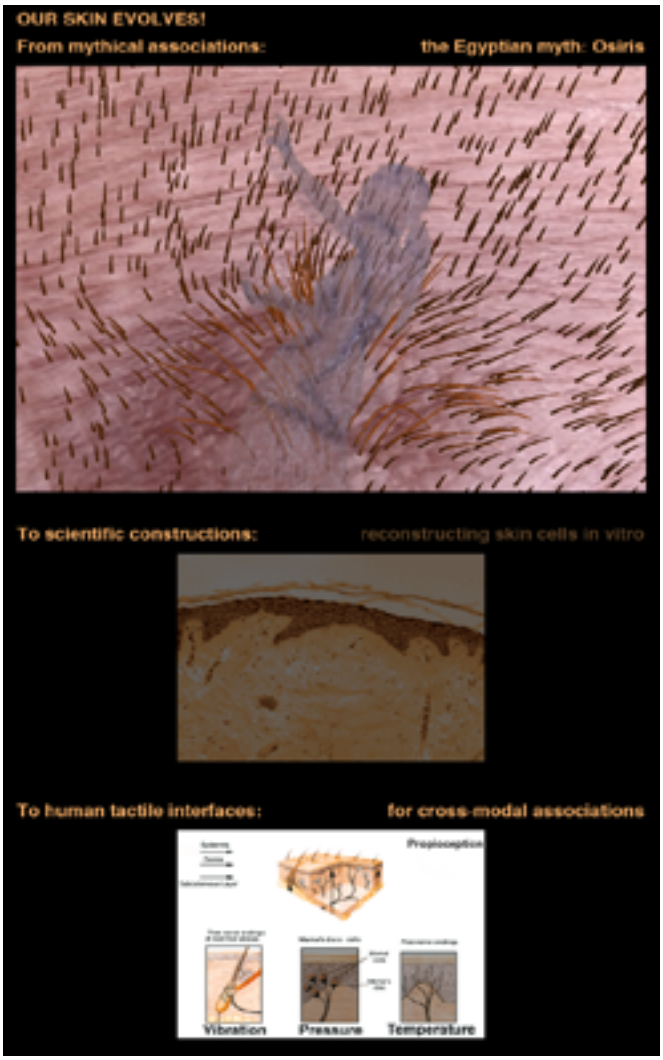
2 / Smart Sculptures
"Smart Sculptures" were built that included DIY off-the-shelf electronics that attempted to biomimic pressure, temperature and vibration. Research was then made into three traditional mythologies about skin from Egypt, China and Australia, portrayed in texts and by dancers for an exhibition. These myths describe how the landscape was created from skin itself. Cultural characters like Isis, the Egyptian god and Pangu, the Chinese god, were said to create the soil from their skin, while in Aboriginal dreamtime stories, the Thorny Lizard constructed the landscape by moving through it and pushing it into various 3-dimensional forms whilst shedding his skin's pigment to create its colours.

3 / Wearable Armband
This is a mobile wearable armband prototype of the interface that came out of the Smart Sculptures and the workshop. It shows a specially designed embroidered circuit based on the Braille Alphabet. electronic sensors and shoulder pad that can be hooked up to a smart phone. This system registers symbolic gestures with single clear meanings to use for visual substitution and navigation.



INTERACTION WITH THE SMART SCULPTURES: BASED ON BRAILLE AND THE TACTILE SENSES PRESENT IN HUMAN SKIN.

THE WORKSHOPS WITH THE VISUALLY CHALLENGED PEOPLE TO COMPARE TOUCH SENSITIVITY. (TANZHAUS ZURICH 2004).



SMART SCULPTURES: ANIMATED MYTHS FROM EGYPT, CHINA AND AUSTRALIA.

ART INSPIRED BY VISUAL SUBSTITUTION, TACTILE PERCEPTION AND CULTURAL MYTHS

ESKIN began with a research project that allowed visually challenged workshop participants to express their feelings of exclusion from visual culture and their desire to create cultural events for sighted audiences. ESKIN encouraged these workshop participants to experiment with customized interfaces. Some interfaces were inspired by neuroscience researchers like Paul Bach-y-Rita who have attempted to understand neural control, morphology, and bodily systems by building electronics to substitute vision. The sensory nerves in our skin pick up the signals of vibration, pressure, temperature and proprioception and translate them into information coded for the central nervous system. Vibration from skin hair is transmitted to the central nervous system and onto the somatic cortex, while pressure is detected by Merkel cells that are embedded deep in the epidermal layer of our skin. These are responsible for transmitting the sensations of pressure and pain. Temperature is felt by the free nerve endings that are located closer to the skin's surface. These three modalities contribute to proprioception that helps to locate one's body in space and perceive its movement. All modalities contribute to our sense of embodiment within an environment. Another inspiration for the ESKIN smart sculptures was the cultural interpretations and mythologies around skin itself. There are many references about skin from history that are relevant for art interpretations and cultural associations.

THE INTERACTIVE EXPERIENCE

The smart ESKIN sculptures were designed as HCI Human Computer Interfaces to promote the development of touch in relation to sound and create an embodied response. Here, the attempt was to make an intelligent artificial skin with off-the-shelf sensors to mimic the modalities of human skin perception. Through these interfaces viewers were able to manipulate the speed of the dancers who performed these myths on the screen. They could also alter the landscapes behind the dancers and the sound compostions to which they danced.
The results from the workshops proved that sound feedback to tactile response could be a valuable navigation device in combination with other sound information from the surrounding environment. With the wearable interface and a waist band size computer, participants were able to combine sound and touch in a new way. Here, cross modal interactions from interfaces like these are essential for the creation of visually challenged peoples' own mind maps. Later this research developed into the creation of media stage platforms for the visually challenged dancers called The ESKIN Performances.

Control of Sound and Image in Room

Communication with other Dancers
Pressure Sensitive Fabric

Gesture Recognition with Accelerometers

ESKIN: WEARABLE INTERFACE FOR THE VISUALLY CHALLENGED PERSON TO HELP WITH COMMUNICATION AND NAVIGATION.

ESKIN WORKSHOP FILM AND INTERFACES IN "SKIN/DANS LA PEAU" FOUNDATION CLAUDE VERDAN, MUSÉE DE LA MAIN, LAUSANNE, SWITZERLAND. (2011).

CREDITS

PRODUCTION CREDITS

ARTIST & DIRECTOR Jill Scott
Daniel Bisig (Artificial Intelligence Laboratory, University of Zurich) • Rolf Basler (Fachhochschule Brugg) • Valerie Bugmann • Andreas Schiffler • Marille Hahne • Lars Pausch (Zurich University of the Arts)

WORKSHOP PARTICIPANTS
Andrea Kuhn • Freddy Gromme • Diego Metzger • Pascal Leinenbach • Helen Larcher • Claudia Gatti • Martin Meier • Peter Fisler

DANCE TEACHERS Carambole Tanz and Theatre Group, Zurich

DOCUMENTARY FILM CREDITS

"ESKIN" (20 mins):
CAMERA & PRODUCTION Marille Hahne
EDIT Annette Brütsch

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Dr. Moria Norrie (Run Time Systems Group, Federal Institute of Technology, Zurich)
Dr. Troester (Wearable Computer Lab, Federal Institute of Technology, Zurich)
The Fachhochschule Aarau and Brugg

SCIENTIFIC CONSULTANTS

Wearable Computer Laboratory, Swiss Federal Institute of Technology, Zurich

EXHIBITION HISTORY

2013-2014 | Neuromedia. ESKIN. INTECH Science Center: Winchester Science Center, UK
2013 | Kulturama Museum des Menschen. NEUROMEDIA, Switzerland
2011 | SKIN/Dans la peau at Foundation Claude Verdan, Musée de la Main. Lausanne. Switzerland
2010 | SKIN INTERFACES at The Welcome Trust. London UK
2009 | Sk-Interfaces: Exploding the borders in Art, Technology and Society at Casino Luxembourg, Forum D'Art Contemporian. Luxembourg
2008 | Lucid Fields at The International Symposia on Electronic Art, ISEA. Singapore
2008 | Body, Art, Disease, Art at the Sci-Art Gallery Center. UCLA, Los Angeles
2008 | Sk-Interfaces: Exploding the borders in Art, Technology and Society at FACT Liverpool, UK
2006 | ESKIN. at The International Symposia on Electronic Art, ISEA San Jose, USA

LINKS

www.jillscott.org

FUNDING

The Film Department, Zurich University of the Arts
The Swiss Federal Commission for Innovation and Technology, KTI/CTI Switzerland

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NEURO_ECO_MEDIA

by JILL SCOTT

AURALROOTS (2014)

SONIC ENVIRONMENTS

Touch sculptures based on stereocilia from the inner ear to hear oral history stories and combine them with different acoustic ecologies.

AURALROOTS: SONIC ECOLOGIES

AURALROOTS encourages the audiences to explore our tactile and aural sensory perception. This media installation invites viewers to interact with 24 hanging sculptures to trigger compositions which can be heard on wireless headphones. The sculptural forms are inspired by the functions and forms of the stereocilia, tiny inner and outer hair cells on our auditory nerves located in the inner ear in the cochlea. AURALROOTS offers a metaphorical learning experience about how we learn through sounds from being embodied in three different sonic environments: (A) as a growing embryo in the womb, (B) as a daughter listening to her mother's stories and finally, (C) as a female artist communicating with auditory scientists. The overall aim is to explore learning through sentience by giving the viewer the capacity to imagine they are immersed inside these sonic environments. The project accumulates tactile and sound knowledge from the purest forms of embodiment – either from inside the body, from being in the natural environment or from learning in the laboratory.

TWO VIEWERS ENJOY THE ORAL HISTORY STORIES IN AURALROOTS. ZEMAK, POLAND. (2014).

THE IDEA BEHIND AURALROOTS

AURALROOTS presents three compositions to explore how knowledge is transferred. The three compositions demonstrate that learning is always "situated" in a particular environment but that different forms of know-ledge can co-exist simultaneously. At different times in our lives our senses work together to learn but it is the accumulation of this knowledge that regenerates the learning process.

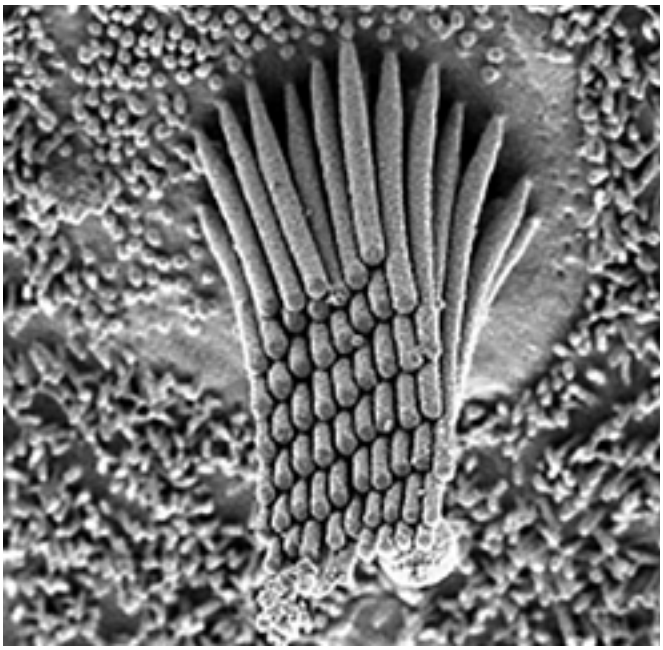
Composition A - in the womb - is a combination of sound, tactile and tacit information based on the embryonic experience in the womb: this tacit knowledge is difficult to transfer to another person by means of writing it down or verbalizing it.

In composition B - oral stories - the holder of information must be integrated into a network or a community of practice for survival. Here, tactile, and sound transfer is related to beliefs, ideals, values, schemata and mental models – a more cognitive dimension of information that shapes the way we, as children, perceive the world. These stories are based on research into oral histories told by First Nation aborignal women to their daughters.

Finally, composition C - education - explores how different forms of information always exist in dialogue with other forms of knowledge and are transferred in a horizontal way: one that is dependent on co-productive stimulation and participation of adults. These recordings are from the Auditory Lab at the University of Western Australia.

By presenting these three options, AURALROOTS presents less formal, codified, or explicit forms of knowledge. The aim is to encourage a new research trajectory that can form the beginning of the history of sound from a eco-feminist perspective!

A VIEWER USES THE SENSE OF TOUCH TO TRIGGER THE SOUND COMPOSITIONS ON THE STEREOCILIA SCULPTURES.



TOP LEFT /
EXPLORING THE HARMONICS OF THE OUTER STEREOCILIA

BOTTOM LEFT /
A SCANNING ELECTRONIC MICROSCOPE IMAGE OF THE STEREOCILIA

RIGHT /
EXPLORING THE VOLUMES AND SOUNDS OF THE INNER STEREOCILIA

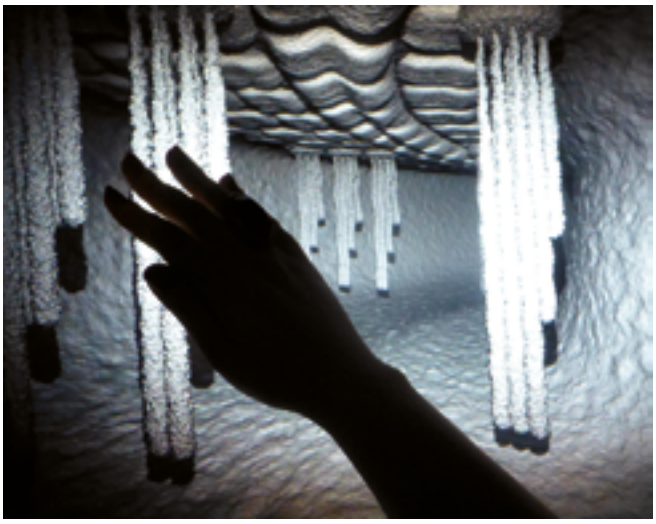
ART INSPIRED BY AUDIOLOGY AND ORAL HISTORY

Sound is essential to learn about the environment around us. Healthy stereocilia are necessary for human hearing. They react to the movement of two membranes (tectorial/basilar) and are surrounded by fluid. This movement has a shearing effect on the stereocilia, allowing links between the hairs to open-up and to absorb chemicals from the cochlea fluid. These chemicals are converted into electrical signals by the cell bodies, which then transmit information through the auditory nerves to the mid-brain and the auditory cortex. Outer hair cells have a different role to play than inner hair cells. Sound art and acoustic ecology share the same interest to extend the experience of our acoustic environments and raise awareness. Here, the metaphor from the arts is to be shrunk down to a nano-meters scale and find yourself standing inside the Organ of Corti in the cochlea and playing with the stereocilia. AURALROOTS also reveals oral history stories from traditional aboriginal cultures about the healing benefits of wild plants and roots. Scientists are currently interested in such plants for their medicinal potentials.

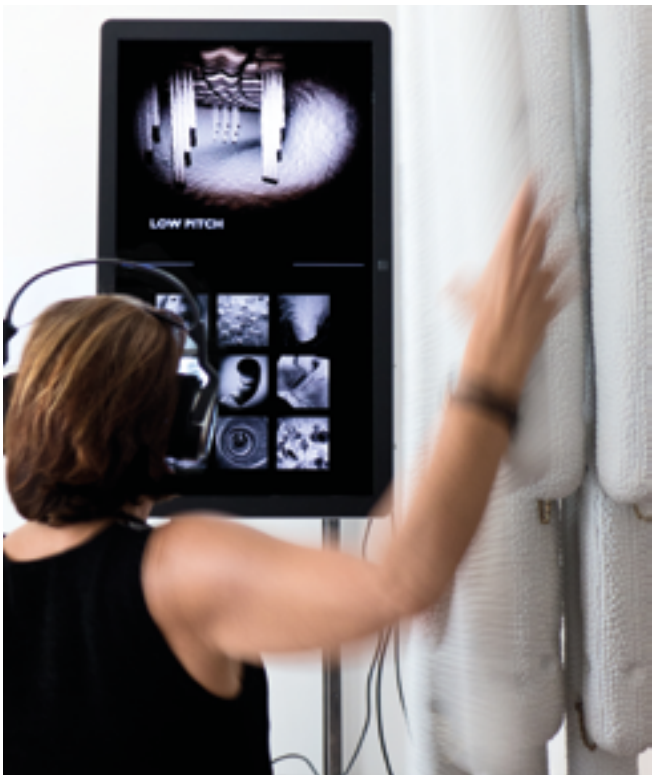
THE INTERACTIVE EXPERIENCE

In AURALROOTS, one set of these sculptural models interpret volume and the other set mimic harmonics. The viewers can mix and manipulate up to 54 sound tracks to be heard on wireless headphones. Interaction with the inner cells set in the cochlea produce harmonics. Playing with the outer hair cells change the volume of the sound samples. The viewer can mix the equalized soundtracks in real-time and change the compositions by touching an animated visualization of the cochlea on a screen. This action triggers three sound compositions. (A) low pitch compositions from the womb, (B) medium pitch compositions from the Australian landscape and (C) high pitch compositions from the science lab.

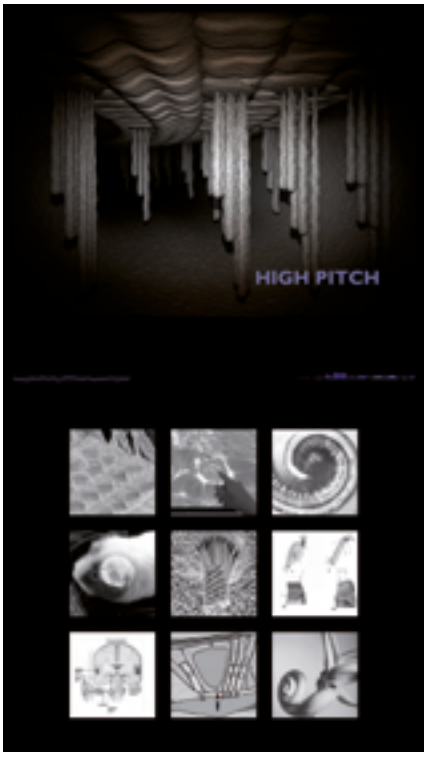
AURALROOTS is programed with Max MSP and C++. The stereocilia swing on balls that are connected to joysticks and all positions on these 120°-degree axes are sent from the joysticks to the C++ program on a Mac mini computer, where 54 sound samples are stored for three compositions. The viewers have responded with fascination and contemplation. They can play alone or with others to create new compositions. Because AURALROOTS has been built based on the behaviour of the stereocilia and oral history stories. the sound compositions encourage the audience to combine touch, sound, and embodied experience in this unique haptic platform.



TOUCH SCREEN USED IN AURALROOTS TO TRAVEL UP AND DOWN THE ORGAN OF CORTI TO SELECT THE SONIC ENVIRONMENTS.



THE LOWER SCREEN REVEALS VISUAL INFORMATION ABOUT THE HIGH, MEDIUM OR LOW PITCH SOUNDS.



LEFT /
LOW PITCH SOUNDS RECORDED FROM CONTACT MICS IN THE WOMB.

MIDDLE /
MID PITCH STORIES ABOUT MEDICINAL PLANTS FROM INDIGENOUS ORAL HISTORIES.
ACTORS: KHI-LEE THORPE, WANDJINA SMITH, LILLIAN CROMBIE, ELAINE CROMBIE, JINNY SMITH, LYN- PAULETTE WHITTON, LILY SHEARER.
COACH: FRED COPPERWAITE.

RIGHT /
HIGH PITCH SOUND FROM THE AUDIOLOGY LAB AT THE UNIVERSIY OF WESTERN AUSTRALIA.

CREDITS

PRODUCTION CREDITS

ARTIST & DIRECTOR Jill Scott
PROGRAMMING & ELECTRONICS Nikolaus Völzow
INDIGENOUS STORIES RESEARCH Tess Corino
RECORDINGS King Street Studios and Koori Radio, Gadigal Information Service, Sydney, Australia
WOMB SOUNDS Les Gilbert (Magian)
ANIMATION Andrew Quinn
CONSTRUCTION HELP Patrick Jost • Marille Hahne
SOUND MIX Olav Lervik • Gregg Skerman
(Zurich University of the Arts)

PARTNERS

SymbioticA and H. Mulders, D. Robertson (The Auditory Laboratory in the School of Anatomy, Physiology and Human Biology, University of Western Australia)

SCIENTIFIC CONSULTANTS

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Dr. N. Diller (The Laboratory of Experimental Audiology, University Hospital, Zurich)

EXHIBITION HISTORY

2016 | Grounded Visions. AURALROOTS. The Swiss Federal Institute of Technology. Institute for Integrated Biology. Grounded Visions was part of Co-Op 21 Arts Festival Paris
2015 | Anatomical Museum Basel, University of Basel, Switzerland
2014 | Sensoria: Premier of AURALROOTS, ZEMAK, Poland

LINKS

www.jillscott.org

FUNDING

Pro Helvetia, The Swiss Arts Council
SymbioticA, University of Western Australia

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NEURO_ECO_MEDIA

by JILL SCOTT

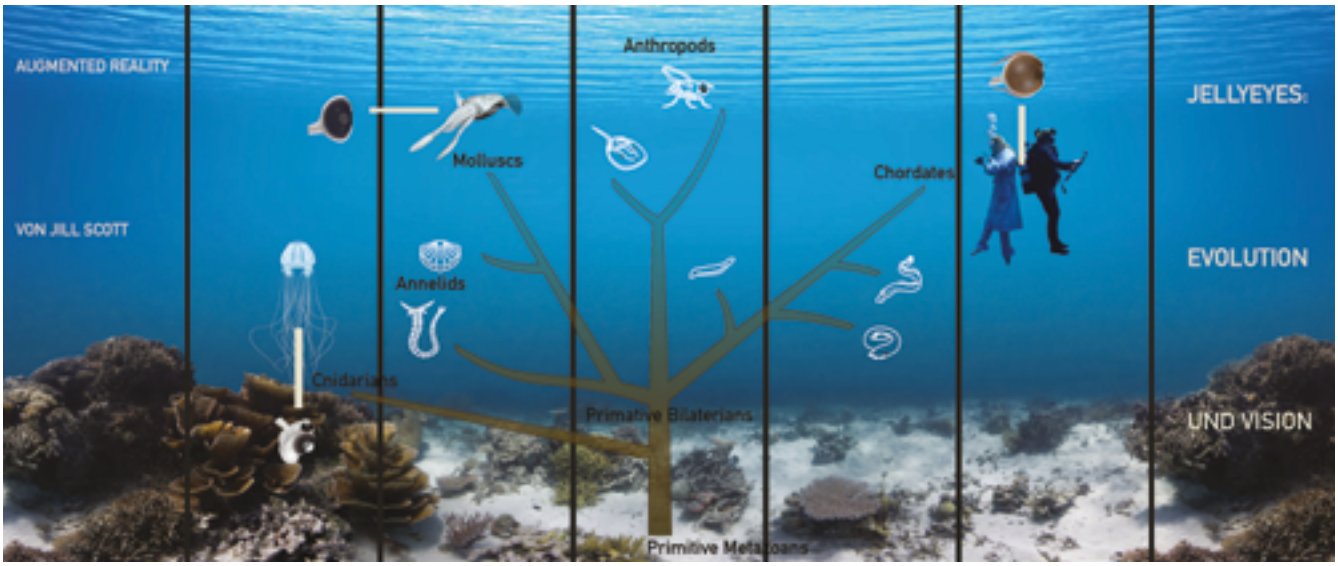
JELLYEYES (2016)

EVOLUTION AND VISION

Use an augmented reality platform to explore the similarities of eyes and current changes in the Great Barrier Reef.

JELLYEYES: EVOLUTION AND VISION

JELLYEYES is an augmented reality artwork based on the evolution of camera-based eyes and the effects of climate change in the Barrier Reef environment. The audience uses augmented reality to follow stories based on three categories of evolutionary theory: structural evolution, co-evolution and comparative evolution. Each story contains metaphorical narratives featuring two characters – a scientist and a tourist. These narratives are inspired by current research in marine biology and neuro-visual systems. In JELLYEYES, the audience can compare the eyes of humans with two underwater creatures: the Australian box jellyfish and the squid or calamari. While all these eyes are based on the same jelly-like substance called the "Vitreous Humor", each creatures' evolution has been influenced by survival and environmental factors. JELLYEYES allows viewers to warm the ocean water in the reef, to witness potential changes to these species. The results show how human impacts like climate change might affect the interactions, relations and lives of species in this environment. Will climate change also influence the evolution of the eyes of humans, jellyfish, and squid?



STRUCTURAL EVOLUTION: INTERACTIVE MAP TO TRACE THE EVOLUTIONARY RELATIVES OF THE CAMERA BASED EYE.

THE IDEA BEHIND JELLYEYES

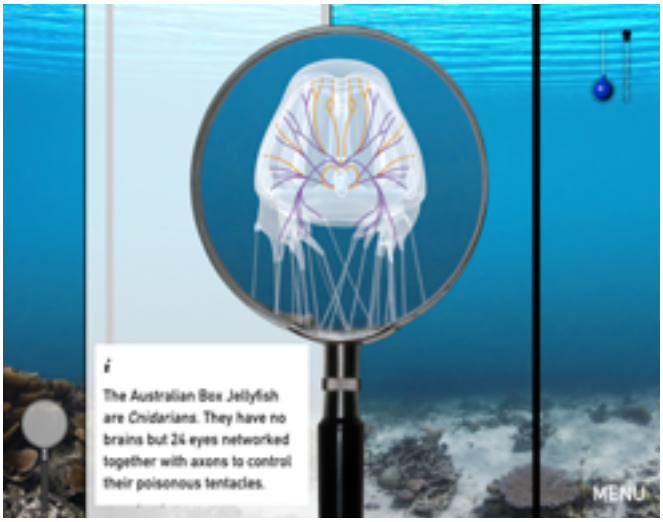
Structural Evolution:
In the past, the evolution of the human eye, the eye of the squid and the eyes of the Australian box jellyfish have been linked. When this type of parallel evolution takes place, organs like the eye can be morphologically alike in overall appearance even though the species are different from each other. Therefore, structural evolutions are related but the outcomes are often quite different. For example, photoreceptors are similar nerve cells, but their locations are different: they are found behind the retina at the back of the eye in humans, in the front of the retina in squid, and in basic ciliary pigment cells in the jellyfish eye. In all cases, they are responsible for vision and light transduction and the definition of objects, but in our eyes, they additionally help us to see in colour. What we share with the box jellyfish and the squid is the formation of photosensitive visual pigment inherited from our common ancestors.

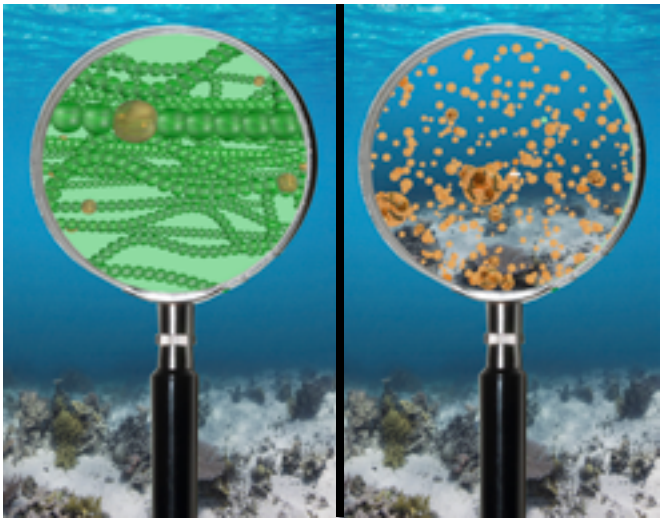
Co-Evolution:
Under co-evolution, the reality of the conditions for healthy co-habitation in the Barrier Reef environment is based on symbiotic developments and essential ecological relationships. Scientists trace if evolutionary change follows a common pathway in two or more distantly related organisms because of similar environmental pressures. With global warming, what might slowly change inside our own eyes and the eyes of our related species in the future?

Comparative Evolution:
Interpretations from neuroscientists often imagine how the animals evolved to see the world differently from us. Such interests encourage empathy for such species and raise viewers' awareness about life and predator prey relations. What is our role as a primary predator and what is our effect on the future of marine life?

THE MAIN CHARACTERS IN JELLYEYES: THE HUNTER (THE TOURIST) AND THE COLLECTOR (THE MARINE BIOLOGIST).

THE MAIN MENU. THE PHOTO WALL FROM THE BARRIER REEF.





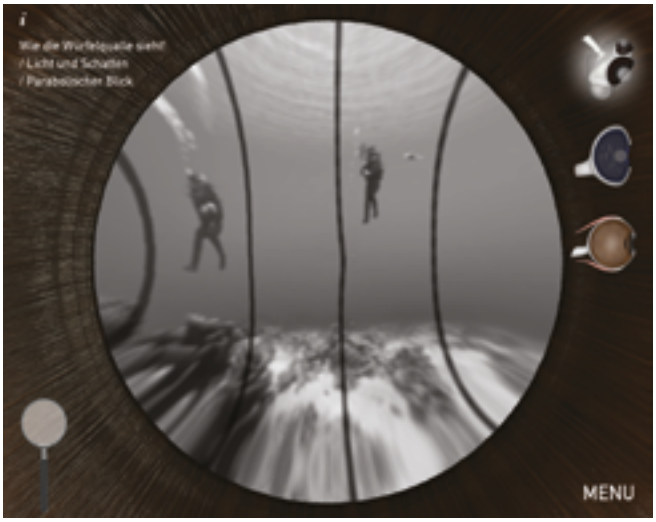
TOP LEFT /
STRUCTURAL EVOLUTION: THE 24 EYES OF THE AUSTRALIAN BOX JELLYFISH.

TOP RIGHT /
CO- EVOLUTION. HUMANS CAUSE WARMER OCEANS WHICH IN TURN INCREASES THE GROWTH OF ALGAE AND MICRO-ORGANISMS TO LEAVE THE CORAL RESULTING IN BLEACHING.

LEFT /
CO-EVOLUTION: THE BIOLOGIST COLLECTING SPECIMENS FOR HER RESEARCH ON EVOLUTIONARY THEORIES.

ART INSPIRED BY EVOLUTION, SYMBIOSIS AND MARINE BIOLOGY

Two scientific research concepts are explored in JELLYEYES, the evolution of the eye in relation to its environment and the effects of ocean warming on species in the Great Barrier Reef. Characters like the human hunter and the evolutionary biologist are part of these concepts. The character of the biologist is based on Lynn Margulis, who discovered a co-evolutionary theory called endosymbiosis in 1981. Endosymbiosis is a theory that eukaryotic cells were once invaded by protobacteria and cyanobacteria. These cells eventually evolved to become the essential powerhouse components of any cell: the chloroplasts and mitochondria. In the Barrier Reef, such bacterial symbionts are essential for the survival of coral, algae, squid, and jellyfish. Do bacteria also have a role to play in the evolution of the photoreceptors of the retina? As Charles Darwin often noted that in marine biology, many species have evolved because of environmental interactions, a reality that human hunters are often not aware of. Evolution is always a holistic view (James Lovelock) and therefore, human behaviour is not only negatively affecting species in environments like these, but also our own survival.

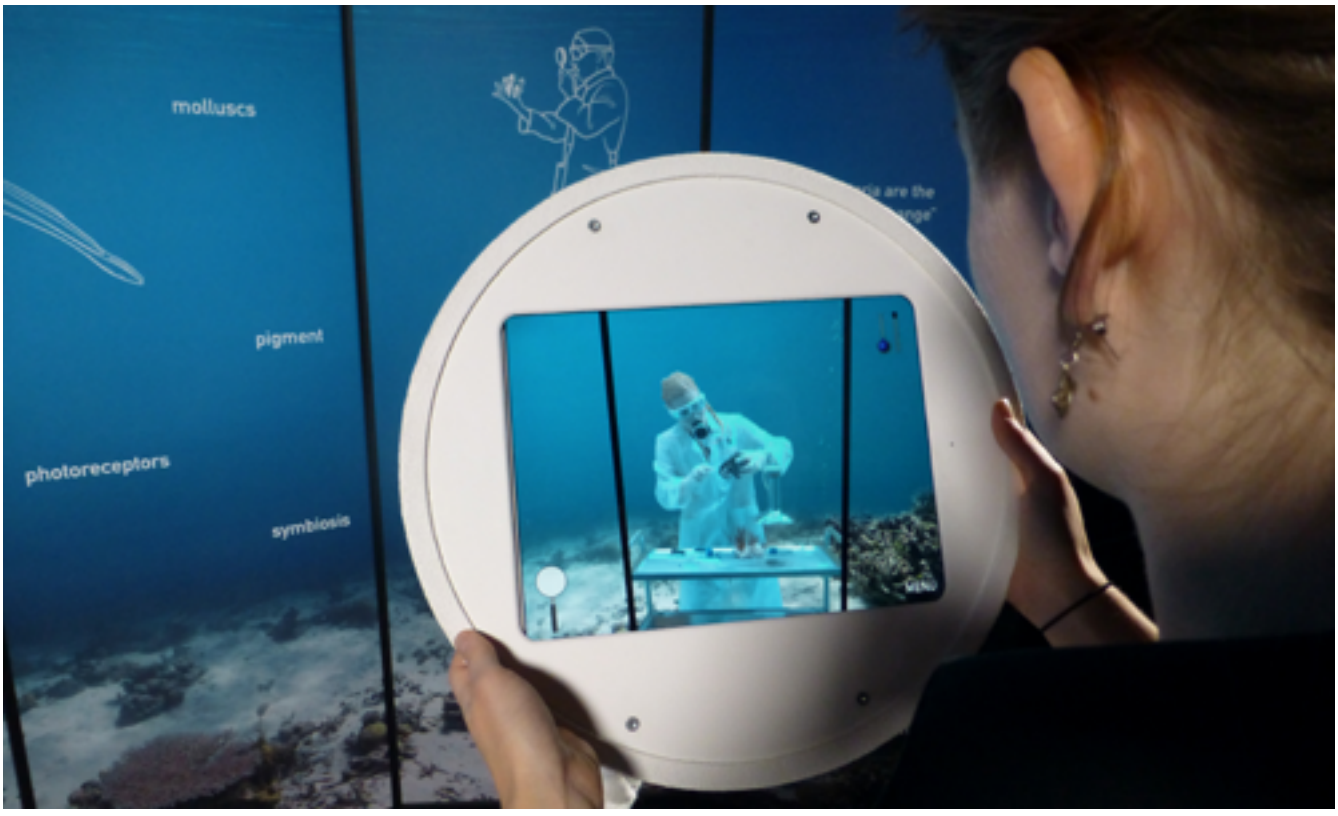


COMPARATIVE EVOLUTION: A BLACK AND WHITE PARABOLIC VIEW THROUGH THE EYES OF THE JELLYFISH.

THE INTERFACE BASED ON THE HUMAN OPTIC NERVE AND OPTIC DISC.

THE INTERACTIVE EXPERIENCE

In JELLYEYES, the viewer stands inside a semicircular photograph of the Barrier Reef holding a tethered iPad whose camera can be used to see this underwater world in real time. The programming is in C++ for an augmented reality App. At first the viewer can choose from a touch screen to go into the narratives of co-evolution, structural evolution, or comparative evolution. Then by pointing the iPad to different parts of the photo wall, the viewer can connect words, images, films and sounds to reflect upon the evolution of vision and how it is related to symbiosis, movement, survival, and the environment. The interaction has two layers, the first layer is intuitive and exploratory, the second layer is based on the touch screen choice of icons, which present the viewer with a close up view for scientific details. The photo also has trigger points that cause the structure of the images in the iPad to reveal surprising information. The iPad is housed in a sculpture based on the form of a large human optic nerve and disk.



CO-EVOLUTION: THE BIOLOGIST CONDUCTS EXPERIMENTS ON CORAL ABOUT ENDOSYMBIOSIS.

CO-EVOLUTION: THE MARINE BIOLOGIST COLLECTS SAMPLES TO COMPARE THE DNA FROM THE EYES OF DIFFERENT SPECIES.

CREDITS

PRODUCTION CREDITS

CONCEPT & DIRECTING Jill Scott
PRODUCTION Marille Hahne
CAMERA Julia Daschner
LIGHT Georg Nikolaus
ANIMATION Natascha Jankovski
POSTPRODUCTION Moritz Huber
PROGRAMMING Nikolaus Völzow

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Prof. Christopher Robinson (Aquatic Research EAWAG, ETHZ, Switzerland)

EXHIBITION HISTORY

2019 | JELLYEYES: Evolution and Vision – AR project in "BEYOND BORDERS. Processed Body – Expanded Brain – Distributed Agency". LAZNIA Centre for Contemporary Art, Gdansk, Poland
2017 | JELLYEYES. Zoological Museum, Zurich. University, Zurich, Switzerland
2017 | Transmediale. Art and Digital Culture. JELLYEYES. Art and Science Node - Capture the Future(s) Evolution 1. Elusive Identity. Berlin, Germany
2016 | The Long Night of Sciences in Berlin/Potsdam. Germany JELLYEYES. Technical Information Centre of the German Patent and Trade Mark Office (DPMA-TIZ), Berlin, Germany
2016 | Femel_Fissions. JELLYEYES. Women in Science. Queensland University of Technology. Science Week. Brisbane, Queensland

LINKS

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FUNDING

Pro Helvetia, The Swiss Arts Council
HFF The Munich Film Academy. Munich, Germany

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University of Zurich

HOCHSCHULE FÜR FERNSEHEN UND FILM MÜNCHEN

schweizer kulturstiftung
prohelvetia

NEURO_ECO_MEDIA

by JILL SCOTT

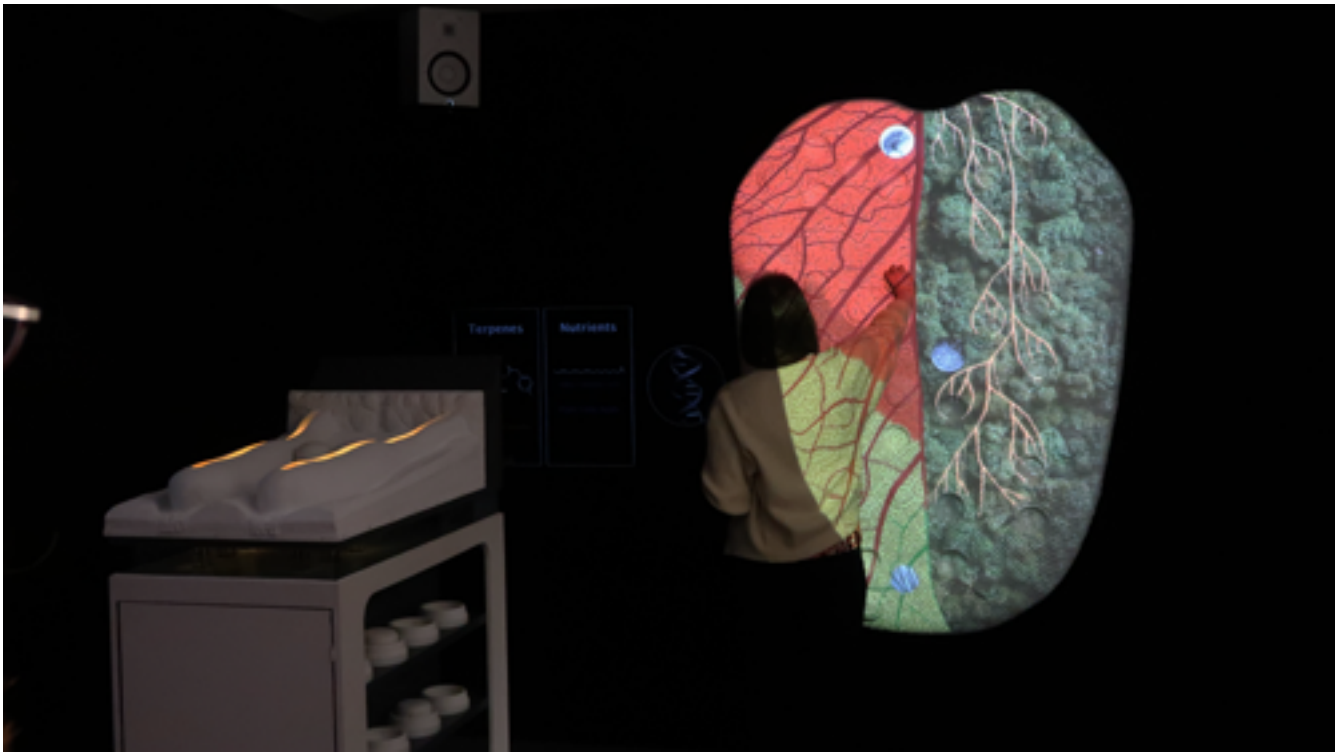
AFTERTASTE (2021)

THE MOLECULAR ORCHESTRA

Play with molecules from plants, explore their enhancement, trigger sounds and visual metaphors about their smells, tastes and health benefits.

AFTERTASTE: THE MOLECULAR ORCHESTRA

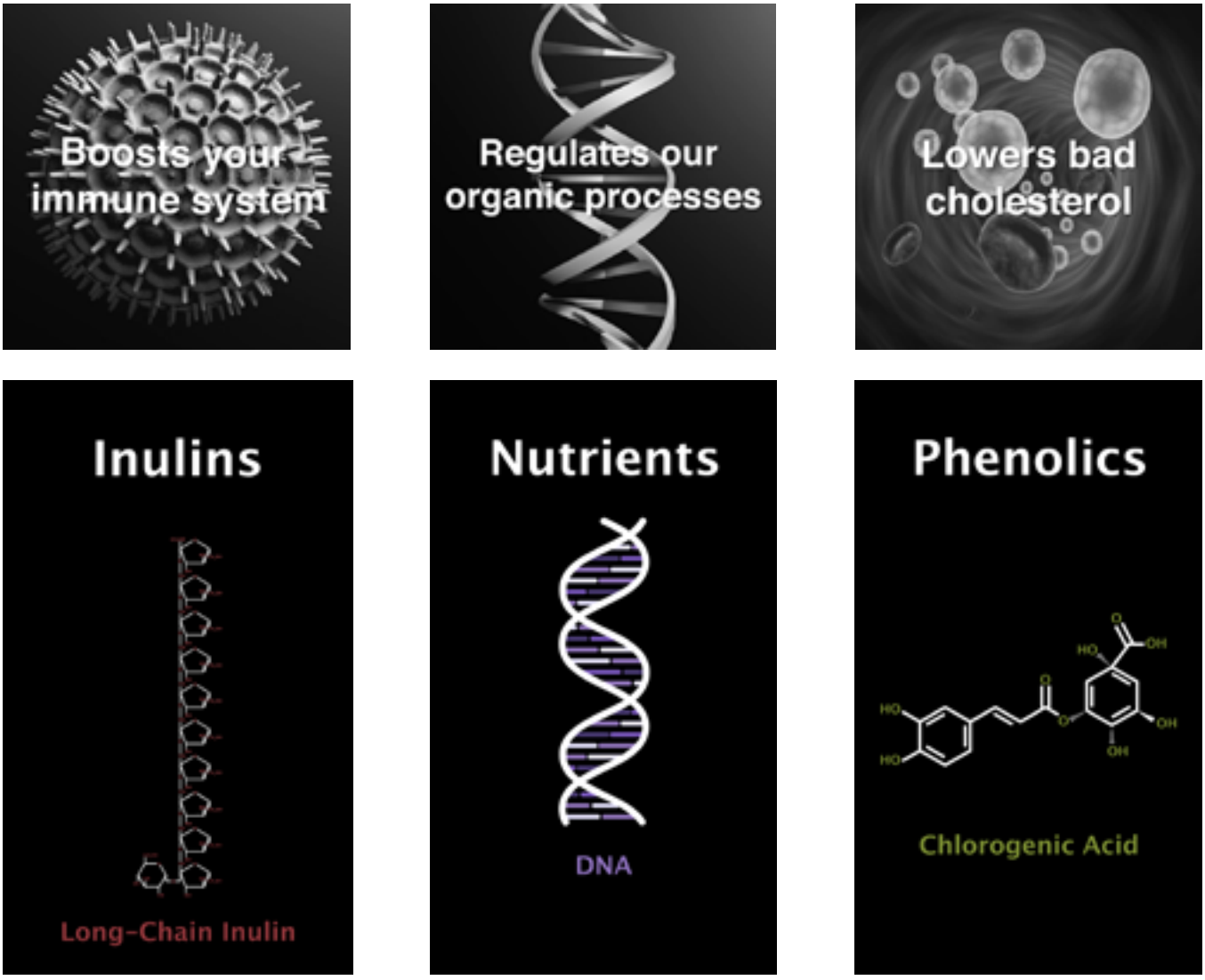
AFTERTASTE is a sound installation about the future of food and health. It consists of sculptures inspired by microscopic images that mimic the surface of the human tongue, the human nose, and a set of 24 food molecules. Plant molecules are like families in an orchestra; they stimulate our senses of taste and smell and combine to register the flavour of food in our brain. Here, the audience is invited to play with 24 molecules that bio-mimic compounds from a plant called chicory (Cichorium Intybus). By playing, the audience discovers their biological families and learns about their potential health benefits. Here, the molecular compounds represent the families of terpenes, phenolics, inulins, nutrients and minerals. In the human body, these compounds operate together to promote our health and growth. Some of these same molecules are currently being researched in biotechnical labs for enhanced food production and novel medicines. The cultivation and modification of these molecules is discussed in an accompanying film called "Chicory Unpacked". This film explores the motivations for these molecules to be genetically altered and interviews farmers and biochemists to reveal their beliefs about this future of food and medical production. The acoustic experience of AFTERTASTE combined with the documentary film encourages the public to playfully interact with each other while learning about enhancement, ethics, and healing properties of chicory's roots.



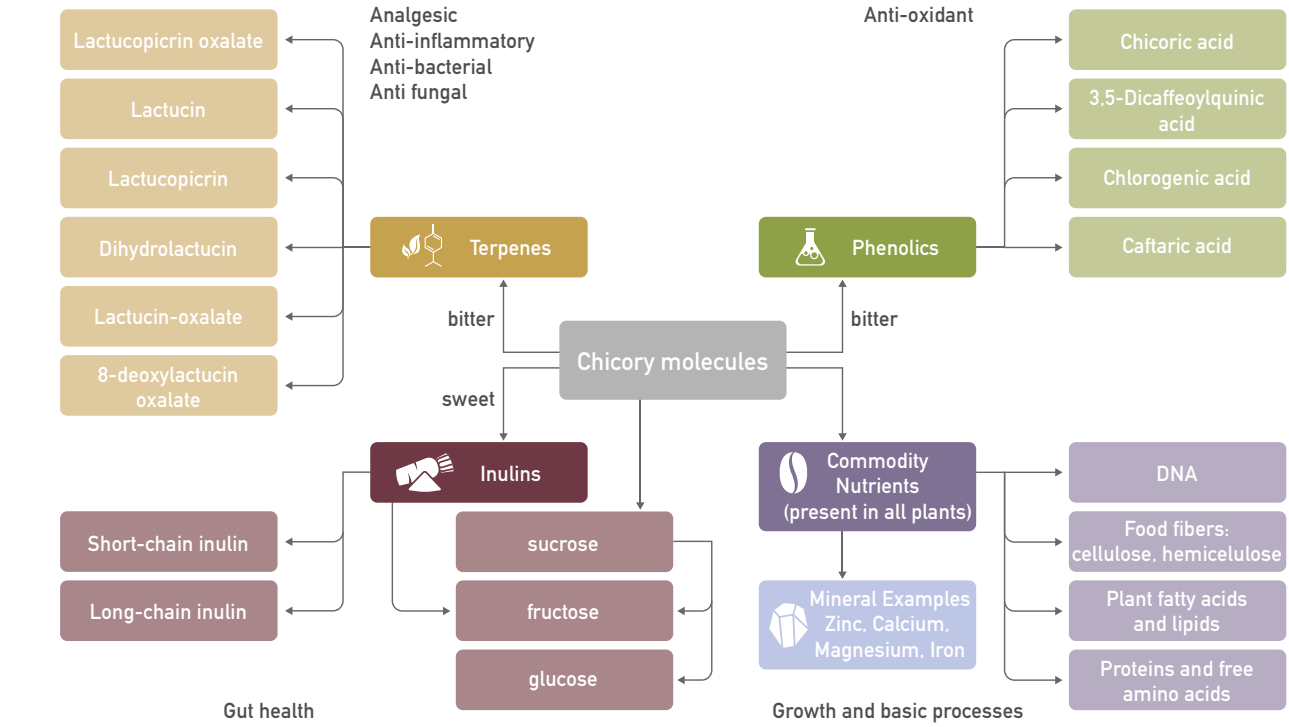
AFTERTASTE CONSISTS OF SCULPTURES BASED ON THE HUMAN TONGUE, THE HUMAN NOSE AND 24 INTERACTIVE FOOD MOLECULES.

THE IDEA BEHIND AFTERTASTE

We, the human species, are now faced with the problem to meet our future needs for healthy food. Could plant cell cultures or genome editing become the next stage of our food production? This project explores multiple concepts and controversies around the future of food and medicine. It is founded on an EU art and science research project into sustainable food security and the potentials of what the biochemists call "New Plant Breeding Techniques" to achieve this goal. These techniques include selective use of editing tools like the CRISPR-Cas9 for which there are strict EU rules in place. Genome editing allows breeding objectives to be achieved quicker and more precisely than ever before, thereby expanding the genetic variation of a stronger or wider variety of crops. However, letting genetically edited plants out into the environment is a risky story that might be followed with precaution. The background for the film, is based on interviews with scientists about the controversies of gene editing inside in-vitro plants compared to products from wild plants and cultivated plants. Traditionally, phenolics from wilder versions of chicory have been introduced as coffee substitutes, and inulin has been extracted from cultivated plants to substitute sugar and enhance texture. Currently, biochemists in the CHIC project believe that genome editing of in-vitro plants can increase chicory`s bioactive terpenes for a variety of medicinal applications. Also, some of the biochemists at the VTT lab in Finland believe that gene editing Plant Cell Cultures in-vitro could also become a new source of food. They say that the impact of food production on the environment can be reduced, while the nutritional and medicinal aspects can be improved. In AFTERTASTE and CHICORY UNPACKED, some of these issues are presented that aim to open-up these debates.



THREE EXAMPLES OF FILM LOOPS ABOUT HEALTH: THESE ARE TRIGGERED BY AUDIENCE INTERACTIONS WITH THE MOLECULES.



TOP /
DIAGRAM OF 5 MOLECULAR FAMILIES.

BOTTOM /
FIVE ANIMATIONS THAT ARE PROJECTED ONTO THE TONGUE SCULPTURE.

ART INSPIRED BY BIOMIMICRY AND BIO-CHEMISTRY

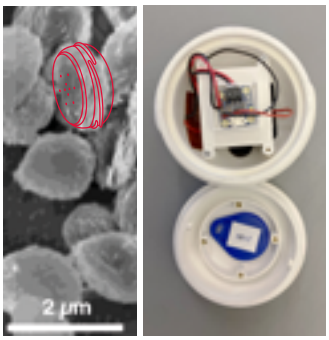
In AFTERTASTE, Scott uses three main methods as interpretive forms of communication to marry art with science: models of scale from MRI or SEM imaging technologies; analogies based on the interaction and interdependence of biological compounds and finally, cross-model interaction or the study of how our senses work together. In AFTERTASTE, the model of the tongue is based on the MRI imaging of Scott's own tongue and scaled up to 200 cm. In the second sculpture, the olfactory bulbs are enlarged by a factor of 500 and each one of the interactive molecules grew from 2 micrometers to 8 cm. The aim of this scaling method is to help the audience feel physically immersed inside actual anatomical models that mimic the behaviour of our senses. In Scott's second method, cross-model interaction between taste, sound, and smell is mimicked with computer programming and DIY electronics. In the third method, Scott believes that analogies can be found by studying the effects of biological compounds and assigning the audience to play out some of these same interdependent roles in an immersive exhibition. So, AFTERTASTE combines sounds from the inner body with musical instrument samples to represent different molecular families. For example, terpenes are represented by string instruments and inulins trigger the sounds of wind instruments. Phenolics are represented by brass instruments, nutrients by voice and minerals by percussion samples. By placing each molecule into the sculptures, the related health benefits or biochemical structures are revealed on additional projections in the space - meanwhile the molecular orchestra of mixed sounds unfolds!

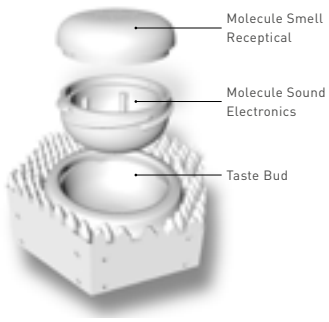
THE INTERACTIVE EXPERIENCE

In AFTERTASTE, tacit learning and haptic media are combined with analogies that bio-mimic some of the bio-chemical reactions in relation to smell and taste. The audience plays the role of "the air" to transport the molecules between the nasal cavity (the olfactory bulb sculpture) and the human tongue sculpture. This creates a real time sound composition that grows with the number of audience members. When the molecules are placed on the nose this triggers orchestral sounds, and turning the molecules shapes the harmonics of these sounds. By placing molecules in the tongue, inner body sounds can be heard and the audience can discover projected information about the molecules healing properties. By giving the audience this power to combine molecules and compare their families, the complexity of biochemistry becomes apparent. AFTERTASTE is an interactive experience that encourages associations about health, food, and flavour in a novel way.

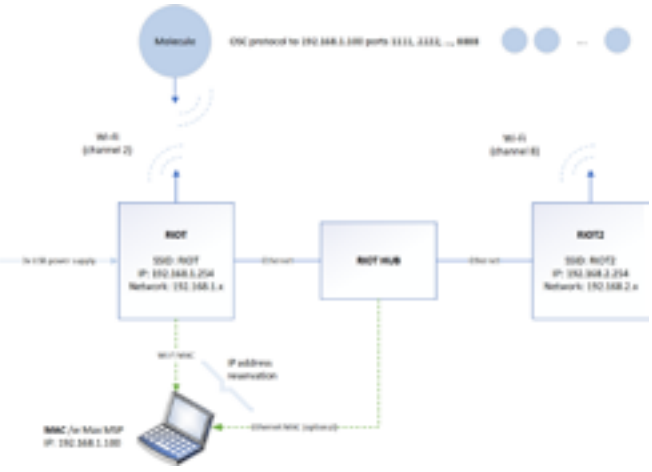
MAGNETIC TRIGGERING: PLACING A MOLECULE IN THE TONGUE.

RFID TRIGGERING: PLACING A MOLECULE ON OLFACTORY BULBS.





IN AFTERTASTE, PHYSICAL COMPUTING TECHNOLOGY IS BASED ON "THE INTERNET OF THINGS". EACH MOLECULE CONTAINS RIOT ELECTRONICS, MAGNETS, RFID READERS AND A SMALL COMPUTER WITH AN IP ADDRESS. THROUGH THIS NETWORK, SOUND AND VIDEO LOOPS ARE TRIGGERED IN REAL-TIME.



THE ELECTRONIC MOLECULAR NETWORK (RIOT SOFTWARE).

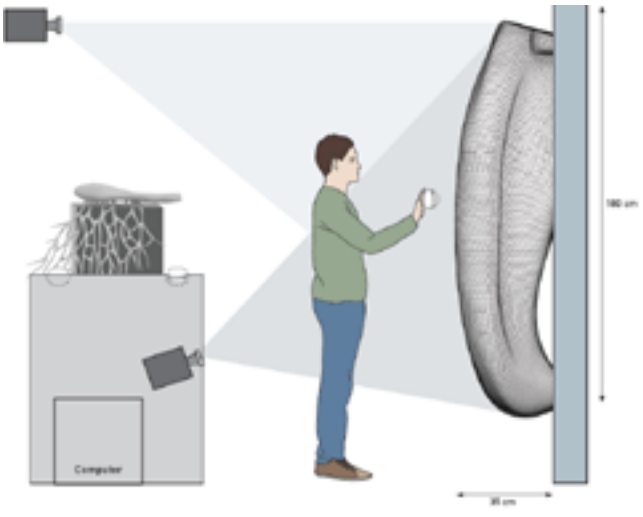


DIAGRAM OF THE TACTILE INTERACTION FOR THE VIEWER.

AFTERTASTE: PLAYING WITH THE MOLECULES BETWEEN THE GUSTATORY SYSTEM AND THE OLFACTORY SYSTEM. GLEIS 70, ZURICH. (2021).

CREDITS

PRODUCTION CREDITS

ARTIST & DIRECTOR Jill Scott
FILM: CHICORY UNPACKED by Marille Hahne

3D MODELS Natascha Jankovski
SOUND DESIGN & ELECTRONICS Vanessa Barrera Giraldo
ANIMATION & GRAPHICS Natascha Jankovski • Jasmine Chastonay
CONSTRUCTION HELP Raffaele Grosjean
PROGRAMMING Nikolaus Völzow • Vanessa Barrera Giraldo
THANKS TO 3D Hubs • Olav Leverik • Annette Brütsch • Thomas Zirlewagen • Wanis Saad Ahmed El Wgali

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SCIENTIFIC CONSULTANTS

Prof. Dr. Stephan Neuhauss (Institute for Molecular Biology – Neurobiology UZH), Sylvie Cuperus (Head of Life Science Zurich UZH, Switzerland)

EXHIBITION HISTORY

2021 | AFTERTASTE: 2021. Capture the future(s): Our Biotech Planet, Routes to Roots. Networks and Beyond. Art Science Node Berlin at the Plant Biology Europe Congress. Amsterdam, Holland

2021 | AFTERTASTE: The Molecular Orchestra. 2021. Air, Waste, Health, Water, Energy, Soil. Art Exhibition at Gleis 70. Zurich, Switzerland

LINKS

https://www.jillscott.org/news.html
https://www.jillscott.org/artworks-current.html
http://chicproject.eu/jill-scott-marille-hahne-residency/
https://artscience-node.com/chic-artists-in-residence/#

FUNDING

ART-SCIENCE NODE Berlin, Germany
Pro Helvetia, The Swiss Arts Council
EUROPEAN UNION 2020 Horizon Project

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prohelvetia

NEURO_ECO_MEDIA

by JILL SCOTT

THE ESKIN (2018-19) PERFORMANCES

CULTURAL INCLUSION PLATFORMS

Visually challenged people dance about their local ecological conditions and use wearable technologies to play sounds from their surrounding ecosystems.

ESKIN PERFORMANCES

ESKIN 4 and 5 are videos from live performances by visually challenged dancers, choreographed on a new interactive media art platform. The ESKIN stage and interfaces were designed to give visually challenged and blind performers the chance to use sound and contact improvisation to reflect on their local biodiverse and climate change problems for a sighted audience. The technology was created to augment and empower these performers with their own voice about climate change and our anthropogenic effects on the environment and let them express themselves about these global issues. The shared aims of ESKIN 4 and 5 were to include visually challenged people in our visually dominated culture, as well as encourage the audiences to be more pro-active about climate justice. By using real-time audio, the dancers were empowered to link their movements to the visual ecological content that appeared on the screen and register their movements on the stage. As the presentations of films from both projects show, this format has the potential to be restaged in different local contexts. In the exhibition they are available as projections with headphones, including audio description versions for visually challenged visitors.

PINA DOLCE MAKES DRAWINGS IN THE SAND THAT ARE PROJECTED ON THE STAGE IN REAL TIME. ESKIN BASEL SWITZERLAND (2019).

THE IDEA BEHIND THE ESKIN PERFORMANCES

ESKIN 4 DURBAN | ESKIN 4 took place in the International Symposia on Electronic Arts, ISEA in Durban, South Africa. Here seven visually impaired learners from the Mason Lincoln School in Durban, two choreographers and five media artists focused on the effects of carbon footprints along the Durban coastline. This coastline is one of the most biodiverse hotspots on our planet with 2000 plant species, 97 km of coast, 18 rivers and 16 estuaries all within 4000 km of river shoreline. Climate change is affecting this biodiversity. Five scenes related to the problems from export crop farming, loss of biodiversity in the rivers, sand erosion in the ocean, species depletion in the forests and mitigation for biodiversity action were featured by the dancers.

ESKIN 5 BASEL | ESKIN 5 was held at the House of Electronic Arts in Basel, Switzerland. Here five visually challenged participants worked with two choreographers and five media artists on the ESKIN interactive platform. Together they focused on the problems caused by biodiversity loss from climate change in the city of Basel, the surroundings of Basel and the Jura Mountains. Five scenes featured the overuse and condition of the soil, trapped heat generated by concrete levels inside city of Basel, the problems of micro-plastics in the Rhine River and extinctions of animals and plangs in the Jura forest. The last scene was about the need for mitigation and community activism about alternative energy resources in this part of Switzerland.

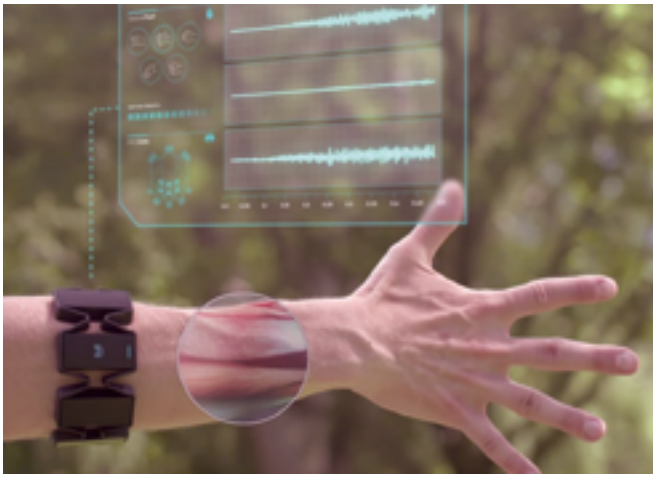
FIVE VISUALLY CHALLENGED DANCERS AND TWO CHOREOGRAPHERS. ESKIN BASEL. THE HOUSE OF ELECTRONIC ARTS, BASEL. (2019).




EXAMPLES FROM THE ESKIN SCENES: (LEFT) THE OCEAN AND (RIGHT) THE FOREST. ISEA DURBAN, SOUTH AFRICA. (2018).

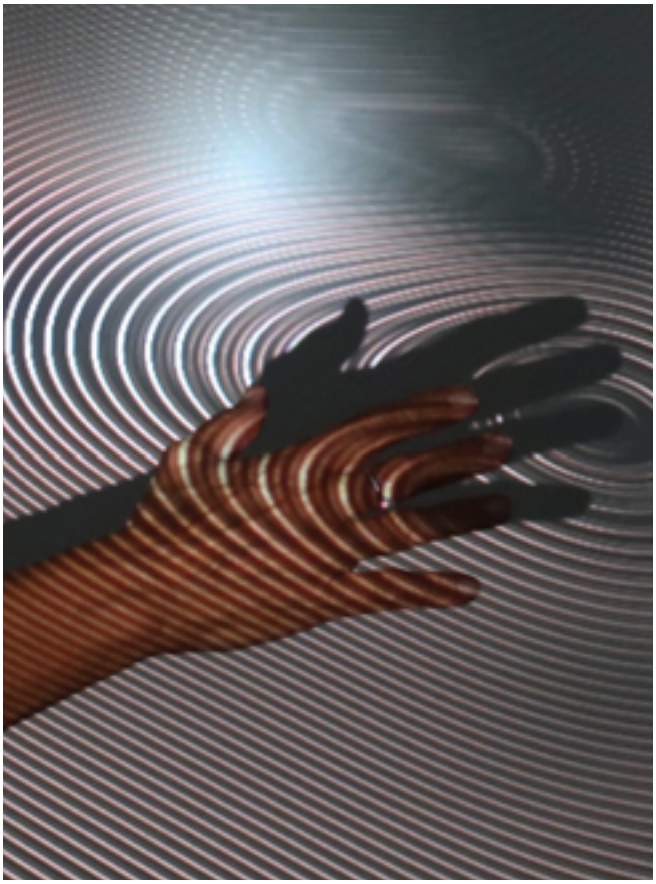
MEDIATED PLATFORM: LOCAL INTERPRETATIONS OF ECOLOGY

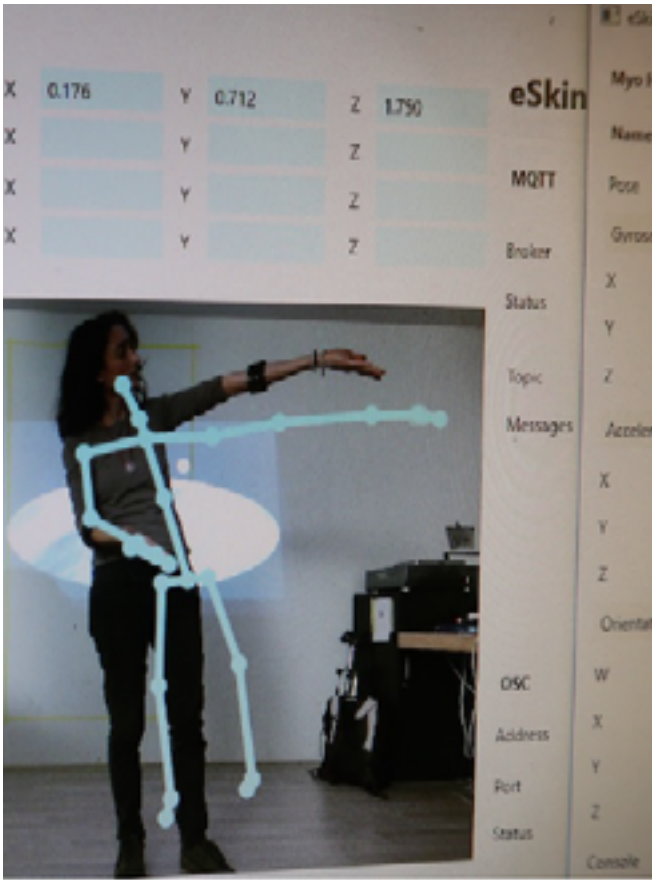
"The Crust of the Earth is our Skin!" In the ESKIN performances, the participants started out with workshops about this metaphor and how the crust of the earth could be cared for by climate change mitigation. They discussed that humans need to actively reduce their (anthropogenic) emissions of greenhouse gases or increase the capacity of carbon sinks through activities such as reforestation. All participants felt that they had something to say about climate change and their wish to be able to speak out in a visually dominant culture, one in which they are mostly excluded. ESKIN is an inclusive and ongoing platform to give visually impaired people the chance to engage as activists in the climate change and mitigation debate. The media artists and the scientists provided access to information about local effects of global warming. This encouraged the participants to relate to these facts and reflect on their own tactile and sound experiences in either the Durban or Basel contexts. The interfaces by the media artists also helped to bring the tactile, visual, and sound perception from neuroscience and ecology onto the same platform where climate change can be felt and heard, rather than only seen!



THE INTERACTIVE EXPERIENCE

For the interactive platform, ESKIN 4 and 5 used three sculptural interfaces to support the dancers on the stage: Myo Armbands, customized Molecular Balls with electronics and KINECT with Touch Designer. The Myo Armbands recognized arm gestures and enabled the dancers via Bluetooth and networks connected to MaxMSP software to access their prerecorded personal sounds and stories. The Molecular Ball interfaces used RioT software to track the movement of these balls and their magnetic fields. These signals were sent via Wi-Fi to MaxMSP software where environmental ambient sounds were harmonized with the background soundtracks. Finally, a KINECT infrared camera hooked into Touch Designer software was employed to trigger real time graphics on the stage screens and to track the movements of all the dancers on the stage. All three interfaces gave the visually challenged dancers hands on experience of technology that they would normally not have had access to. They used these interfaces to augment their expressions and their personal reactions to climate change.





THREE INTERFACES FOR THE ESKIN PERFORMERS:
(TOP LEFT) THE ELECTRONIC MOLECULAR BALLS, (LEFT MIDDLE) THE MYO ARMBAND. (RIGHT) THE KINECT MOTION TRACK CAMERA.

ESKIN DURBAN, SOUTH AFRICA: THE FOREST SCENE WITH KINECT MOTION MAPPING AND INTERACTIVE SOUND MOLECULES. ISEA. (2018).

CREDITS

PRODUCTION CREDITS
CONCEPT & DIRECTION Jill Scott
DOCUMENTARY, LIGHTING & SET Marille Hahne
SYSTEMS DESIGNER Andreas Schiffler
REAL TIME VISUAL DESIGN & PROGRAMMING Andrew Quinn
ELECTRONICS & AUDIO ENGINEERING Vanessa Barrera Giraldo
SOUND RESEARCH Valerie Bugmann
AMBIENT MUSIC Olav Lervik
SOUND INTERACTION DESIGN Victor Giers

ISEA Durban 2018
WORKSHOP PARTICIPANTS/DANCERS Nomkhosi Gumede, Nompumelelo Zikhali, Nozipho Zungu, Balungile Thwala, Melusi Khumalo, Vusumuzi Khumalo, Sboniso Ngubane
DANCERS/CHOREOGRAPHERS
Thobile Maphanga. Lorin Sookoolm
CO-PRODUCERS Tyla Coppinger (ISEA), Bongeka Gumede (Mason Lincoln School), Mandla Matsha (drums)

HEK Basel 2019
WORKSHOP PARTICIPANTS/DANCERS Pina Dolce, Roberto Collidoro, Nicole Pfister, Leila Grillo, Daniel Fernandes
PRODUCERS HeK, Basel
CHOREOGRAPHERS Dominique Cardito, Tommi Zeuggin
EXTRA HELP: Daniel Fernandes, Daniel Bisig (wearable shoes), Lucie Bader Outreach, Promotion

PARTNERS
Durban 2018: The Museum of Natural History. South Africa
ISEA2018 and Mason Lincoln Special School in Umlazi

Basel 2019: HEK, House of Electronic Arts, Basel

SCIENTIFIC CONSULTANTS 2018 Basel
Dr. Christian Feigenwinter (Atmospheric Sciences, Meteorology, Climatology and Remote Sensing (mcr), University of Basel)
Crowther Researchers organized by Tara Lasrado (Crowther Lab ETHZ, Zurich)
SCIENTIFIC CONSULTANTS 2018 Durban
Dr. Angelika Hilbeck, ETHZ, Zurich, Switzerland
The Natural History Museum, Durban, South Africa

EXHIBITION HISTORY
2019 | ESKIN 5 for the Visually Challenged: House of Electronic Arts HeK. Basel, Switzerland
2018 | ESKIN 4 the Visually Impaired at The Natural History Museum and ISEA, The International Symposium on Electronic Art, Durban, South Africa

FUNDING
ESKIN Durban: ISEA, International Symposium on Electronic Art and Pro Helvetia, The Swiss Arts Council.
ESKIN Basel, House of Electronic Arts, Basel. Switzerland and Schweizer Kulturstiftung Basel. Stiftung Corymbo, Stiftung Blindenheim Basel, Verein Zmittsdrin, Blind Spot Radio.

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NEURO_ECO_MEDIA was designed by the Swiss/Australian Media artist

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