Exhibition Information:

The Electric Retina

Contact:Prof Dr. Jill Scott:
Institute for Molecular and Cellular Research
Department of Neurobiology
University of Zurich; Switzerland

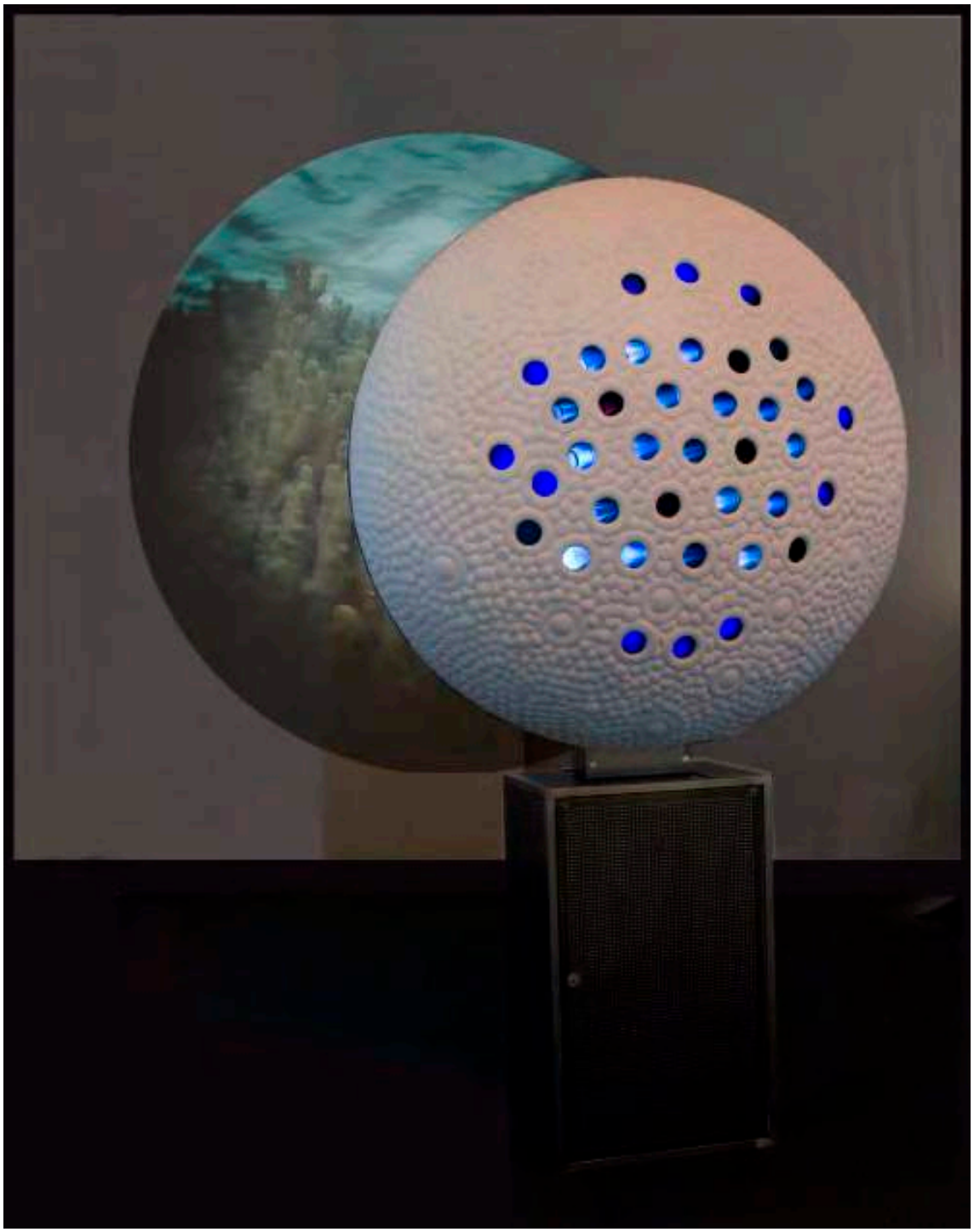
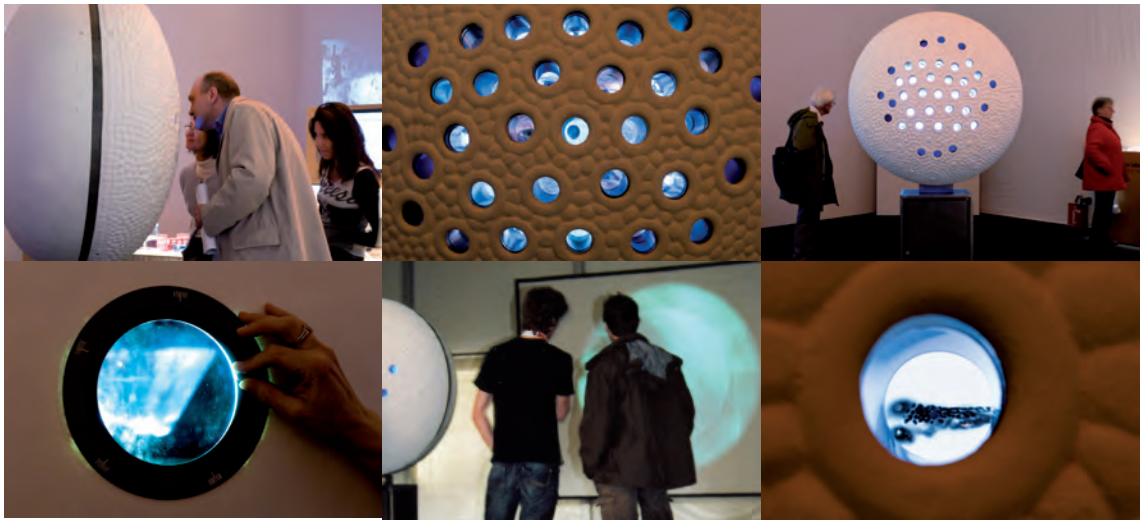


Fig.1: The Electric Retina at the Brain Fair. Zurich 2008



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Jill Scott
The Electric Retina

combining scientific research with media art for educational purposes

demystifying scientific research for the general public through metaphorical interpretations

1. Description and Set up

Summary
The Electric Retina combines retinal research and interactive media art with metaphorical associations about visual perception. In 2006 Scott was an Artist-in-Residence at the Stefan Neuhauss Group in Neurobiology in the Institute of Zoology, University of Zurich. Here she learnt about the genetic control of visual system development and function by analysis of zebra fish mutants, similar human eye diseases. There she built a media-sculpture based on the study of photoreceptors called «The Electric Retina». By interacting with the Electric Retina sculpture, the viewers can see movie-loops from cellular research and projected underwater visions about behaviour in order to gain a better understanding of how our visual perception and our cognitive behaviour are affected by genetics, disease and degeneration.

2. Exhibitions: Prior and Forthcoming

2015 | Scientifica, ETHZ | Zurich, Switzerland | THE ELECTRIC RETINA
2014 | The Dusseldorf Quadrinalle, IMAI. NRW Forum | Dusseldorf, Germany | THE ELECTRIC RETINA
2013-2014 | The Winchester Science Centre and Planetarium | Winchester, UK
2012 | KULTURAMA | Zurich, Switzerland
2009 | Super Human. RMIT Gallery; curated by ANAT | Melbourne, Australia | THE ELECTRIC RETINA
2008 | Lucid Fields: ISEA | Singapore | THE ELECTICE RETINA
2008 | Parcours Des Wissens. The Brain Fair, University of Zurich | Zurich, Switzerland | THE ELECTRIC RETINA
2007 | Life Science Commission: University of Zurich | Zurich, Switzerland | THE ELECTRIC RETINA

3. Content and Comment from the Artist

In The Electric Retina, I have aimed to combine retinal research with interactive media art and embody metaphorical associations in order to demystify the complexity of visual perception research. Therefore, this work not only attempts to reflect the aims of the researchers at the Stefan Neuhauss Group in Neurobiology in the Institute of Zoology, University of Zurich, but it reflects my own experience of learning about human visual perception on a deep self reflective level.

The Electric Retina allows the viewer to gain a deeper insight into scientific research on human eye disease, which is primarily to gain genetic control of visual system development and function by analysis of zebra fish mutants. They wish to understand the relationship between the zebra fish retina and similar human eye diseases and to share their research with other international researchers. The Electric Retina displays examples from some of this research and it resembles a huge human retina, because surface of the sculpture is constructed according to the rod and cone pattern array of photoreceptors in the human retina. Inside these cones the viewers can see oculars, where movie-loops appear about the histological evidence, behaviour tests, molecular staining, cellular research images and related keywords from the researchers. The issues covered are macular degeneration, human diseases of the eye and various genetic deficiencies.

The viewers look through the tunnels into the neural chemical layers of the eye. On the other side of the sculpture films of underwater movies are projected onto the wall. These are shot from the perspective of the fish. This «fish eye view» shows how visual impairment can affect the animal´s behaviour. The projected films (affect) are directly related to the content of these ocular films (evidence) and aim is to allow the general public to gain a better understanding of how vision is affected by genetics, disease and degeneration.

On a self-reflective level the project is also about my own visual degeneration.

During the Residency in the Science lab, I was diagnosed with Low Pressure Glaucoma, a genetic disease of the Optic nerve. Therefore the effects of this disease are also reflected in the Electric Retina.

Credits
The Neuhauss Lab, Esp: Corinne Hodel, Prof. Dr. Stephan Neuhauss, Melody Huang, Oliver Biehlmaier, Colette Maurer, Markus Tschopp, Marion Haug
With special thanks to:
Editing Support: Marille Hahne. Programming and Sensoring: Andreas Schiffler and Marcus Dusseiller. Steel and Surface Construction help: Simone Lüling and Beat Schlaepfer

4. Educational Potentials

The Five main educational goals of the project were to incorporate art and science through the design of an appealing media sculpture thereby promoting trans-disciplinary practice; to provide an opportunity for more informed interpretations typically gained from an artist in residence project; to make an innovate document about the research which is currently taking place inside the lab and to highlight the work of the PHD research students. The residency attempted to bridge the gap between scientific research on animals and human disease and to generate a new level of discussion within the scientific community itself. This sculpture is suitable for the general public because it actually transfers knowledge between science and the general public using art as a communication platform and catalyst. It also encourages people to learn in an interactive way about eye disease and it demystifies scientific research for the general public through metaphorical associations. It helps the general public to grasp the complexity of scientific research and it supports scientific research by demonstrating the impact of research on the future of human health.

5. Description details of The Electric Retina

The back-side of the abstract sculpture represents a cut through a part of the photoreceptors where the movement of the rods and cones are clearly visible. The surface is inspired by images from the Scanning Electron Microscope (SEM) and tangential cuts from histology of the zebra fish eye. A set of oculars are used to represent these receptors, and the audience can see images through them like they are looking through the tunnels into the neural chemical layers of the eye. An abstract section of the receptors are modelled because the idea is to only show a selected part of the receptor array, which is similar in both the human and zebra retinas. The zebrafish is the main amphibian that is currently being used by neuro-biologists at the Institute of Zoology, University of Zurich, for their important research. Two film sequences are «embedded in» and «illuminating from» the sculpture and these serve to also clarify the comparison between

human and zebra fish retinas. For contrast another sequence shows the difference between a compound eye and a vertebrate eye. The information for the public is divided into two parts: (1) ocular films and (2) projected films.

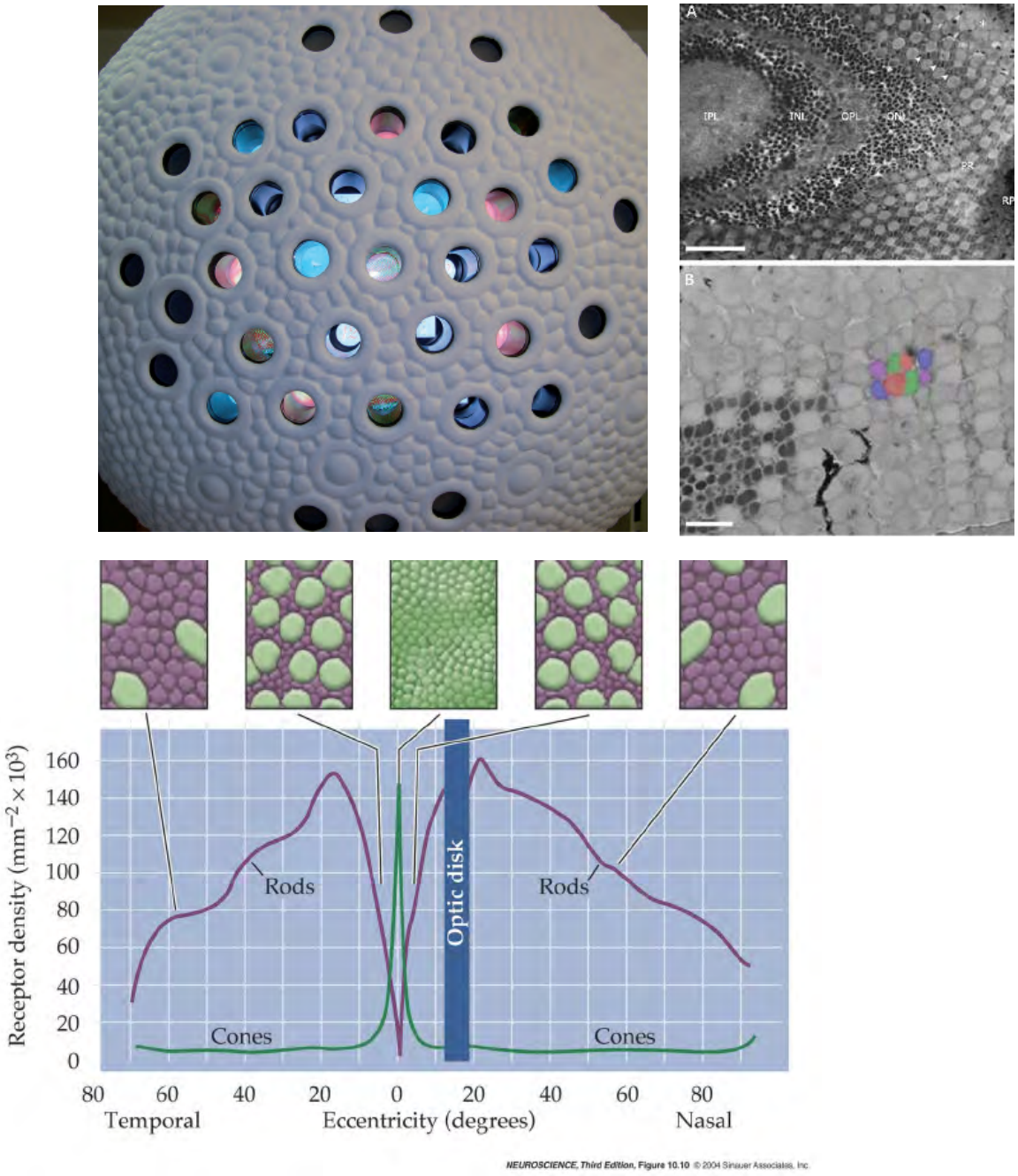


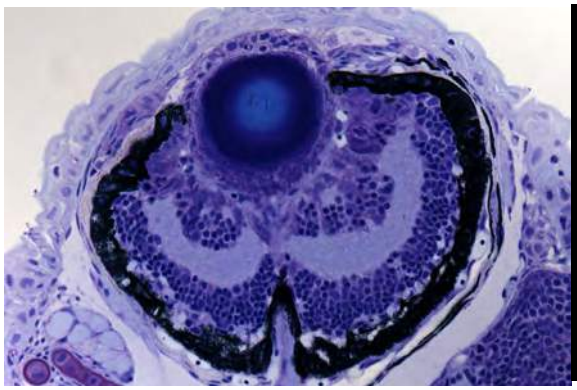
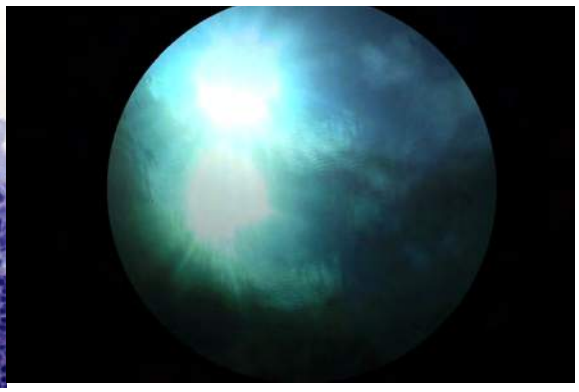
Fig. 3: Image of the tangenital cut through the retina of the zebra fish and the sculpture surface tests, which are inspired by the photoreceptor surface.

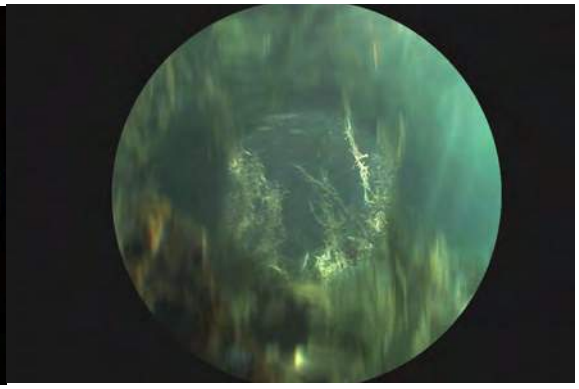
Sequenced film details

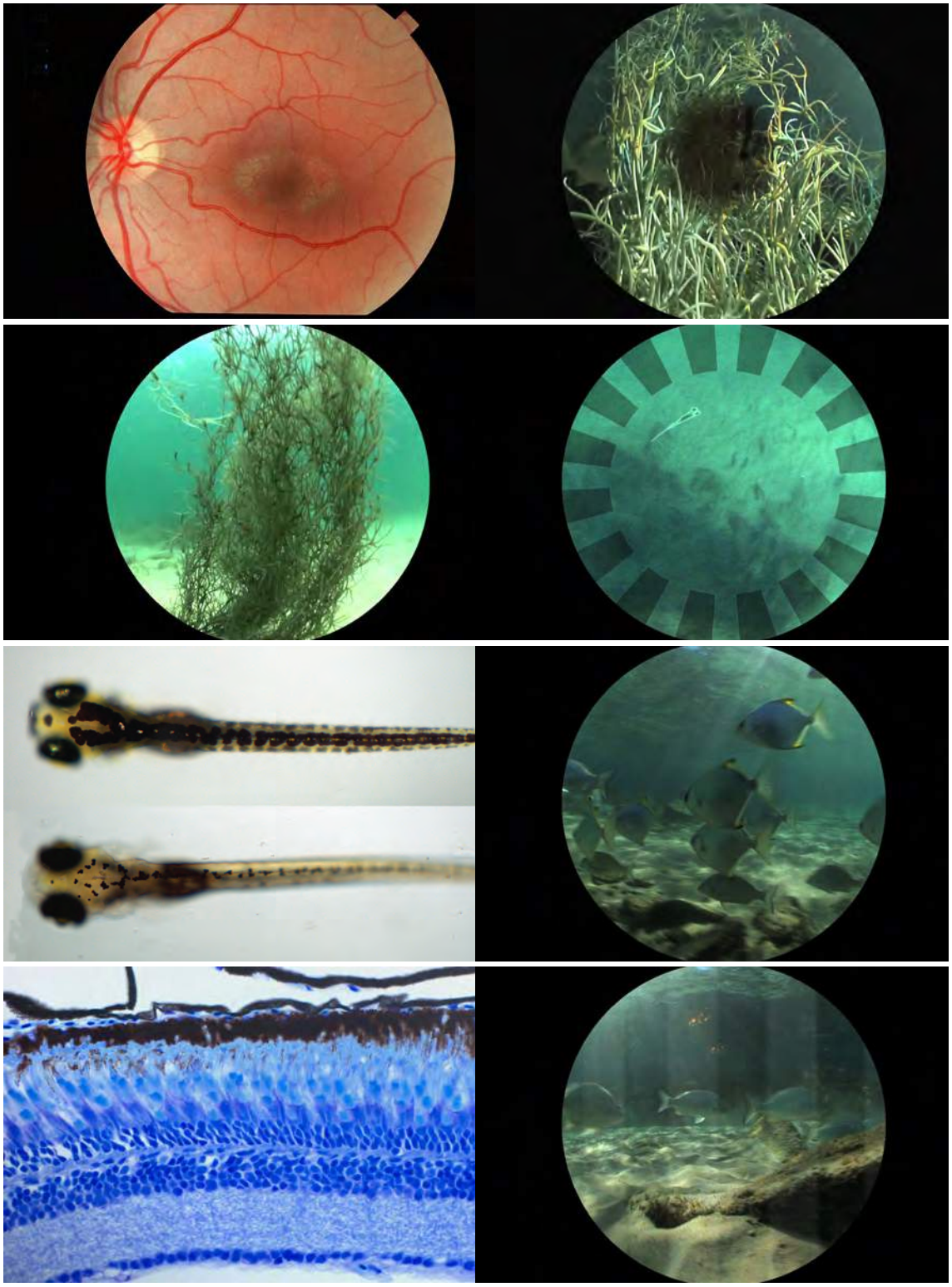
The ocular films are randomly displayed in the photoreceptor tunnels and are influenced by the generated patterns of red/blue and green cones and rods. The content of these

films are based on images from the actual research currently taking place in the Neurobiology lab itself: Ushers Syndrome (Zebrafish), Diabeties (Human), c Glaucoma (Human) Macular degeneration (Human) and congenital nystagmus (Belladonna Zebrafish). Normal Light Adaptation in relation to the studies of the Zebrafish retina are also included. By walking around the sculpture, an individual viewer can select five sequential sets. The projected films are windows that match the content of these ocular films. The aim is to give the viewer a better understanding of how vision is affected by genetics, disease and degeneration. The projected films will show underwater landscapes, which have been distorted by the particular genetic or degenerative afflictions described in the ocular films. In other words they are shot from the fishes point-of-view. These shots range from more obvious samples like the development of black spots in the central part of an image representing macular degeneration to more complex behavioural reactions. Some examples will be created and simulated by post production effects while others include behaviour generated simulations like the orientation of mutants whose genetic make-up causes them to swim in circles.

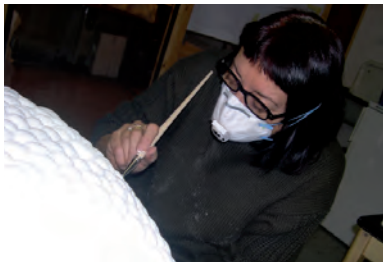
Ushers Syndrome (Zebrafish),
Diabeties (Human),
Glaucoma (Human)
Macular Degeneration (Human)
Congenital nystagmus (Belladonna Zebrafish).
Normal Light Adaptation (Zebrafish)





ig 4: These examples show three set of ocular films and three related sets of projected films representing some current research undertaken in the Neurobiology Lab, University of Zurich: macular degeneration, the genetic study of fish noir and light adaptation.



6. The Artists Biography

Jill Scott was born in 1952, in Melbourne, Australia and has been living in Swizerland since 2003 (C Permit). Currently she is Professor for Research in the Institute Cultural Studies in Art, Media and Design at the Hochschule für Gestaltung und Kunst (HGKZ-University of Applied Arts) in Zurich. Switzerland and Vice Director of the Z-Node at the University of Plymouth, UK. Her recent publications include: Artists-in-labs Processes of Inquiry: 2006 Springer/Vienna/New York, and Coded Characters Hatje Cantz 2002, Ed. Marille Hahne. Her education includes: PhD, University of Wales (UK) MA USF, San Francisco, as well as a Degree in Education and a Degree in Art and Design form the University of Melbourne. She has exhibited many video artworks, conceptual performances and interactive environments in USA, Japan, Australia and Europe since 1975. Her most recent works involve the construction of interactive media and electronic sculptures based on studies she has conducted in retinal neuro-morphology, artificial intelligence and neuroscience.

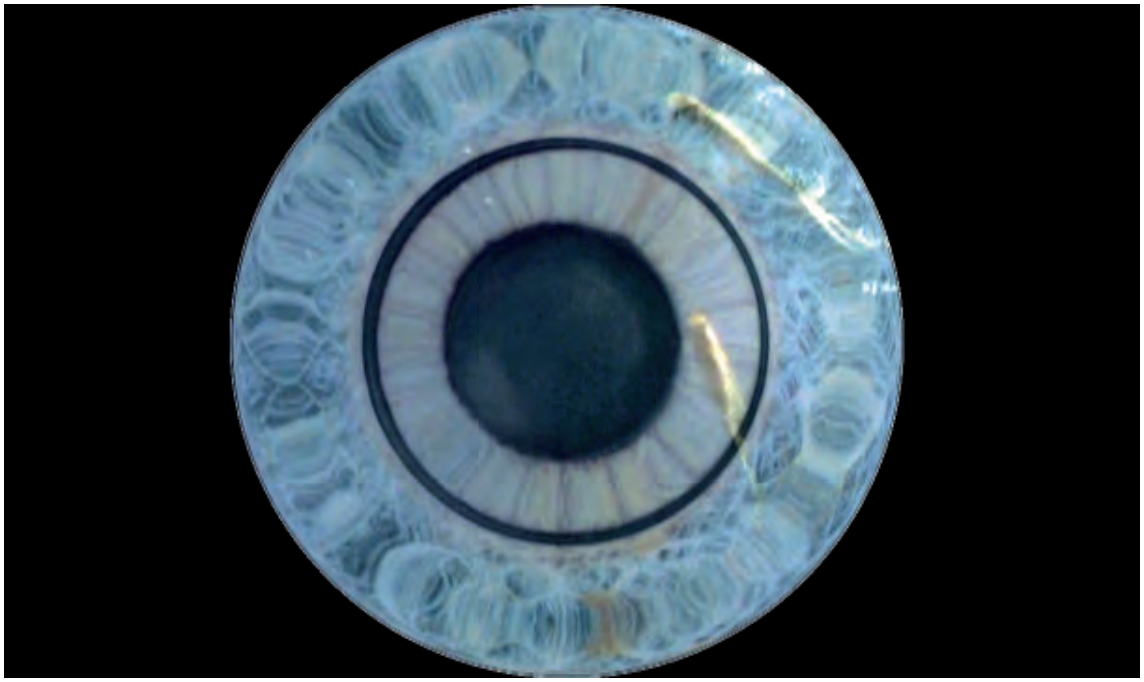


Fig 5: Image from the Attract loop- which blends an image of Jill Scotts Iris with the image of two Zebra fish.

7. Equipment list:
The Electric Retina. Breakdown of all the Parts.

Parts to Be Shipped

1	1x Steel Frame	207cm high / 122cm diameter on top 80x50x35cm base (drawing available) cables are in the base	60kg
2	2x Spheres	120cm diameter x 38cm high	60kg
3	1x Glass Lens	16x17x3cm	1kg
4	1x Mirror	38x40x6cm	4kg
5	1x Set Oculars PVC (25 inset)	60x60x19cm	10kg
6	1x Box Electronics: Remotes, Interfaces, etc	26x33x26cm	6kg
7	1x Media Player Shuttle SN27P2	With Linux software and 2 HDTV video cards S/N: SN27P200R0713F00228	10kg
			151kg

Audio-Visual Equipment: needed to be supplied

1	LCD Screen	Multeos NEC LCD screen / M40 / no legs 1920x1080 resolution (101.6cm diagonal)
2	AV-Simple Computer Monitor / Mouse	Phillips (for testing)
3	Projector	Beng SP830 / SP83 Digital Projector + Remote