

# LIGHTWAVE MEDIATOR HANDBOOK

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## WHO ARE WE

### What?

The Science Gallery is a world first. A new type of venue where today's white-hot scientific issues will be thrashed out and you'll be able to have your say. A place where ideas meet.

### Why?

Science impacts all our daily lives yet can still seem mysterious. We will open science up to passionate debate and encourage your involvement. How do you want science to develop? What direction should it go in?

### How?

Through a programme of exhibitions, public experiments, challenges, festivals, debates and workshops.

### Specifically?

Exhibitions like LIGHTWAVE featuring 'LED light graffiti', an installation by U2's lighting designer Willie Williams. Events like 'Tigers Lair' – eager entrepreneurs pitch their business ideas to seasoned venture capitalists.

### Who?

We will attract policy-makers and innovators, artists and technologists, media and the public. We will especially connect with 15-25 year olds to fire them up with a passion for science.

**Because?** Ireland needs young, motivated scientists if it is to thrive in this new century. And we all need to have our say on how science affects our lives.

### Who runs it?

Dr Michael John Gorman is our founding Director. He has held fellowships at MIT, Harvard University and Stanford University. He has been involved in exhibitions and events such as *Save the Robots*, *ArtBots* and *Crane Ballet*.

### Where?

The Naughton Institute: A fantastic, new landmark building bang in the heart of the city on Pearse Street, in the grounds of Trinity College Dublin.

## ABOUT THE SCIENCE GALLERY

### **Our Mission:**

“To ignite creativity and discovery where science and art collide”

### **Our Vision:**

“The Science Gallery vision is to be the world’s leading enterprise for involving, inspiring and transforming curious minds through science. We will achieve this by encouraging our audience to discover, express and pursue their passion for science through a changing programme of exhibitions, festivals and experiences. All vividly brought to life at the dynamic intersections where science and art collide”

## **LIGHTWAVE**

LIGHTWAVE is a nine-day festival that explores light our ability to control it and its ability to control us. The idea for a festival of light was initially seeded by Stephen Heppell, founder of UltraLab in the UK he is a world leader in investigating and developing opportunities for learning through ICT.

### **How did we find the installations?**

The Science Gallery is all about ideas meeting. In deciding on the installations to appear at LIGHTWAVE we put out an expression of interest, far and wide, asking people to put forward their ideas for potential installations for LIGHTWAVE. We received over 150 expressions of interest and assembled a curatorial team including representatives from science, engineering, computer science and the arts to review the expressions and select a short list.

We were looking for installations, which explored light in a participative way and gave our audiences opportunities to engage in science and technology in a playful and entertaining manner.

### **And the events?**

The accompanying events and workshops programme was developed by the Science Gallery team and contains elements that reflect our ongoing programming model, in this regard LIGHTWAVE is also a proof of concept for the Science Gallery and will give an indication on future events.

### **Anything specific?**

The Science Gallery wants to create a space where connections between people lead to creativity, ideas and innovation. There are a number of opportunities in the area of science and technology that are often missed by young people because their experience of these subjects has traditionally been more didactic. We'd like to change that.

One of the key programmes to address this is Be Made. Mentoring workshops will involve a range of techies, scientists, engineers and techno-artists that are interested in working with young people to develop participative installations using creative technologies. Some mentors may facilitate classes others may suggest ideas.

These mentoring workshops will be a feature of all the programmes we run in the Gallery and will continue to develop alongside all the major themes and exhibits.

## LIGHTWAVE INSTALLATIONS

### LUMIA DOMESTICA: WILLIE WILLIAMS



#### What?

Lumia Domestica is made up of a series of illuminated acrylic turntables mounted directly onto the gallery walls. Placed on each turntable is a glass object, which revolves, refracting the light into a self-generating kaleidoscopic display.

One set of turntables contain normal incandescent bulbs. The bulbs illuminate a series of gels that are rotating on perspex turntables. The glass objects are placed on a turntable moving in a counter clockwise direction.

Another set of turntables contain laser lights as found in laser pens etc these create more direct reflections onto the Gallery walls.

#### Why?

The exhibit is a generative light piece. Patterns on the wall are created by the lights within the turntables as they reflect and refract off the glass objects creating a kaleidoscopic effect on the Gallery walls

### Who?

Willie Williams has been responsible for the lighting design and direction of all U2 tours since 1982. In addition to his work with musicians Willie is a well known light artist.

### What to do?

Encourage the audience to touch the objects they can move them or if they bring along a glass object they can place it on the turntable

## LIGHT DROPS: ELKE HARRAS

### What?

Ambient light installation consisting of several ceiling drops made with various materials such as fabric, crystals and metal – incorporating technology such as LED, fiber optics, laser, low and high voltage halogen. Within the installation there will be sound and movement of light in different areas thus creating an inviting atmosphere for the audience and allowing them to explore the space. An extra effect is created through the shadows cast by the strings that move allowing the light to be transported beautifully.

### Why?

By combining different techniques with unusual material, thus creating new effects and enabling the audience to view the latest technology in an interesting and playful manner.

### Who?

Elke Harras specialises in public art and illuminated glass structures. She has been commissioned to create site-specific light sculptures for public spaces including ITN, London and BNS Bank Zurich. She is based in Germany.

**Drop 1 - BEDOUIN TENT:** is a square tube of fibre optic curtain that changes colour in slow motion and looks like a Bedouin Tent from the distance.



**Drop 2 - ENERGIZED STRINGS** is a circular tube of white strings illuminated from below thus creating a spectacular star movement on the ceiling by the heat generated.

**Drop 3 - LIGHT SHOWER** changes its colour by sound commands. A person can stand within it to be bathed in their preferred light, eliciting a feeling of well-being.



**Drop 4 - CRYSTAL LIFE** reflects light through crystals, which are suspended within a drop on various levels and show light in its truest form.

**Drop 5 - RAINBOW** transports the light along the string fabric, creating a rainbow effect through its entirety by the use of glass filters and high voltage halogen.



**Drop 6 - PURE** will incorporate pure light in combination with crystals and laser technique.

## HAND CRANKED LUMINESCENT JEWELLERY: LOVID

### What?

It will introduce basic electronics that produce light, including the use of LEDs and discussion of Electroluminescent Wire and LCD screens. Alternative energy sources will be introduced, focusing on harvesting human power through hand-cranked, foot pedal, and bicycle generators, with additional discussion of environmental energy sources including solar and wind power. The hand cranks will provide the power for the circuits and pieces, which can be stitched into material at their station. The audience can engage directly with LoVid find out how to make a basic circuit and build their own piece.

### Why?

Fashion is inherently social, a way to interact with people and to communicate personal ideas and form connections nonverbally. This project builds on design and art, through the use of science and technology, particularly electronics and physics. This workshop and the associated event will allow participants to gain insight into the

technical details of electronic components and circuits that produce light. It will educate about the energy used in producing such light, giving participants a physical understanding of the energy that goes into operating and controlling such wearable technology. Importantly, it will also provide building blocks and a starting point for future experiments and developments.

### **Who?**

LoVid are an interdisciplinary artist duo comprised of Tali Hinkis and Kyle Lapidus. Their work includes live video installations, sculptures, digital prints, patchworks, media projects performances and video recordings.

## **THE HELIOSPHERE: ANNA HILL AND PETER GALLAGHER**

### **What & Why?**

#### **The Sun in 3D:**

This installation is projecting real time images of the sun. These images are from the SOHO, the Solar & Heliospheric Observatory. It is a project of international collaboration between ESA and NASA to study the Sun from its deep core to the outer corona and the solar wind.

SOHO was launched on December 2, 1995. The SOHO spacecraft was built in Europe by an industry team led by prime contractor Matra Marconi Space (now EADS Astrium) under overall management by ESA. European and American scientists provided the twelve instruments on board SOHO. Nine of the international instrument consortia are led by European Principal Investigators (PI's), three by PI's from the US.

NASA was responsible for the launch and is now responsible for mission operations. Large radio dishes around the world, which form NASA's Deep Space Network, are used for data downlink and commanding. Mission control is based at Goddard Space Flight Center in Maryland.

By putting on the 3D glasses you can experience a solar flare, which is a plume of plasma from the sun producing electromagnetic radiation. Solar antennae placed on the roof of the School of Physics pick up on this electromagnetic radiation. Anna Hill has worked with a group of scientists and engineers to develop tunics, which allow

visitors to feel these electromagnetic vibrations. Thus you can see and feel the sun at the same time.

### **Aurora Synapse:**

In 2003 Anna Hill went to Finnish Lapland to photograph, film and record the aurora borealis or northern lights. This installation was first shown in Kilkenny in 2003.

The installation creates a 3D soundscape and uses low frequency radio wave recordings from the Sodankyla Observatory.

Hill, worked with Esa Turunen, a geophysicist who has argued that the northern lights have an audible sound. The local people call this audible light.

In the installation the breathing of the visitor into a breath sensor causes the projection of the aurora onto curves of suspended fabric. The brightness and proximity of the projected images varies according to the patten of breathing. Anna worked with a bioengineer to develop this technology.

### **Who?**

Anna Hill is a BAFTA nominated artist and founder of Space Synapse Ltd., an Irish innovation company creating human space interaction. Peter Gallagher is the leader of the solar and space weather research group at Trinity College Dublin

## LIGHT TRACER: KARL D. D. WILLIS

### What?

Light Tracer functions by analysing a real time camera image (from camera situated above the screens) and overlaying the brightest areas marked out by the user to create a drawn image.



As the user moves the light sources across the face of the camera, the brightest areas of the camera image are extracted and recomposed onto the incoming realtime image, which is then projected onto the screen, this is similar to the technology used in recent O2 ads where people are drawing with their phones.

The user can choose from a selection of pen-lights and battery powered torches to emit light, or alternatively use any light emitting everyday devices they may have with them, e.g. cellphones, lighters and so on.

Each device offers a different way to mark out imagery on screen; brighter torches make it possible light up an object such as ones face or hand and trace its likeness on screen

### Why?

The aim of Light Tracer was to tap into the user's desire to be creative, as a means to engage them with the interactive experience itself. I subsequently found that creativity was expressed not only through the imagery created by the user, but also in the way they approached the task of drawing.

Upon first coming across Light Tracer, users commonly draw squiggly lines or write their names but often enough experimentation progresses beyond such simple interactions. Users quickly discover the system is sensitive to light, and proceed to write with their cell phones, lighters, or even while smoking with cigarettes. Tracing with light also produced interesting interaction, with users tracing out their t-shirt prints.

### **Who?**

Karl D D Willis is a New Zealand-born Tokyo based interaction designer/media artist and a research student at the University of Tsukuba

## **DE PONG GAME III: BENJAMIN GAULON AKA RECYCLISM**

### **What?**

De Pong Game III is a recycling of the game Pong from Atari console 1975 – 1977. In this new version, which is built with the programme Flash, you play against the surrounding architecture instead of another paddle/person. The image of a building is recorded and its architecture mapped out onto a computer screen. This map of the building is then projected directly onto the façade.

### **Why?**

Recycling is a recurring theme in Ben's work. He regularly makes new works from discarded or obsolete equipment. De Pong makes us realise the potential of older technologies to open a gateway to new technology and how much we discard and throw away in the rush to buy what's new.

### **Who?**

Ben Gaulon is a new media artist that creates physical pieces using DIY technology.

## **CAMERA LUCIDA: DMITRY GELFAND AND EVELINA DOMNITCH**

### **What?**

Camera Lucida is a free-standing transparent chamber demonstrating sonoluminescence. Ultrasound waves move through a gas-enriched fluid causing tiny bubbles to implode at temperatures as hot as the surface of the sun creating fluctuating emissions of light.

Sonoluminescence until recently could only be viewed in a highly specialised sonochemical laboratory.

### **Why?**

Dmitry and Evelina are both from a science background and became interested in sonoluminescence as a form of sensory extension or psychasthenia. They have shown Camera Lucida at a number of venues throughout Europe as an installation and performance piece.

There is an element of controversy surrounding sonoluminescence, research carried out in the Rensselaer Polytechnic Institute in New York claimed to have produced fusion reactions. However Dmitry and Evelina's interest is more in the dynamic that occurs between the audience and the installation at a sensory level.

Unlike countless artworks that attempt to evoke a state of synesthesia, their current project, Camera Lucida, is a continually evolving light sculpture that allows one to see sound moving through space – right at the delicate horizon where acoustics and optics meet.

By means of a phenomenon called sonoluminescence, sound waves are directly converted into light inside a glass chamber filled with gas-infused liquid. After adapting to the absolute darkness surrounding the installation, the viewer/listener gradually perceives the highly detailed shapes and movements of multiple sound sources. Previously, the only way to view sonoluminescence has been in a highly specialized sonochemical laboratory. Now it is in an altogether different environment. Camera Lucida presents the first opportunity for people outside the scientific community to experience this rare phenomenon.

Researchers have been probing sonoluminescence since 1934. Though the phenomenon still cannot be fully explained, it is known that the light emanates from imploding microscopic gas bubbles triggered by an acoustic field, which renders sound visible. In this conversion of sound into light, temperatures are produced that are as high as those found on the surface of the Sun.

### **Who?**

Evelina (Belarus) and Dmitry (Russia) are artists involved in art works which explore unusual sensory environments.

## **BEE MATRIX: BEAU LOTTO**

### **What?**

Live Bumblebees inhabit an enclosed flight arena. The installation is almost continually observed by Beau who is training the bees to respond to different colour stimuli through administration of nectar in pods. Over the course of the week we will see how the bees learn to perceive light. This will be etched out through a laser etching system onto blocks of Perspex.

### **Who?**

Beau is a Reader in neuroscience and head of lottolab at University College London. He received his undergraduate degree from the University of California, Berkeley, in anatomy physiology, a PhD from Edinburgh's Medical School in cellular and molecular developmental neurobiology, and was a research fellow at Duke University. He is co-author of the book entitled *Why We See What We Do*, and his colour illusions have been used by many other scientists, artists, teachers and science museums internationally.