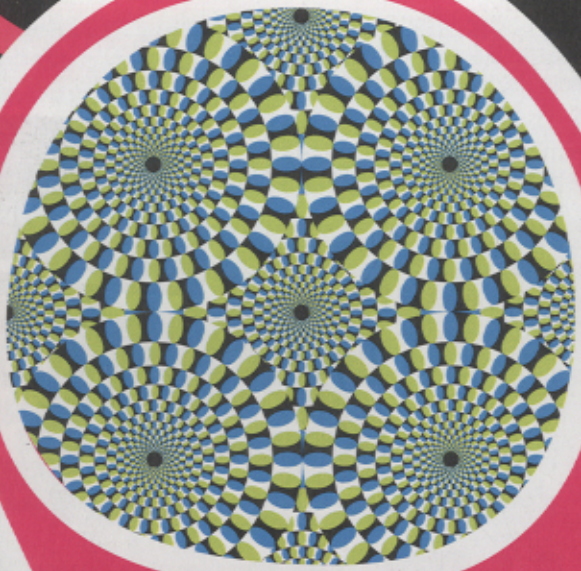
NEWCASTLE SCIENCE FEST' 2011

12-17 MARCH



Let your imagination come out to play at ScienceFest

A 6-day festival for all ages

Lung dress: Polyurethane sponge, velvet (viscose and silk) Devore 'paste', perspex, nylon

The lungs develop from two small buds which branch many times to make the adult structures. When we breathe, oxygen is taken in to the body and carbon dioxide is expelled. This happens in the lungs.

The lungs have a big surface area provided by millions of small airways. These determine the amount of oxygen the lungs can take up from the Lung dress.

The Lung dress is made from soft, shiny sponge mimicking lung texture and the shine of surfactant, which is released as the lungs expand. The lung buds, represented at progressively more developed stages, are hung beneath the chest piece, made of a fine 'crin'. The most elaborate branching pattern is printed on the velvet and chiffon "wing-like" adult lungs, ascending from the back of the dress.

Spinal column Dress: Silk chiffon (printed by Coats Viyella Plc), resin, aluminium leaf, fibre optic threads

The spinal column or backbone is made up of units of bone called vertebrae. These form in the early embryo from repeated cell groupings called somites. Depending on their position in the embryo the somites will form neck, thorax, lumbar or sacral vertebrae.

The fabric used here is 100% silk and has been printed by Coats Viyella Plc. Using a DNA sequence run from a laboratory gel the patterning here is used to recall the molecular basis of embryonic development. This female spine has been cast in resin and hand plated with aluminium foil. 8,000 fibre optic endings have been sealed into a 1 inch light source and fed through the spine at irregular intervals. These fibres represent the nerve processes that extend throughout the body.

Supported by
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www.primitive-streak.org

Catalytic Campus

Catalytic Clothing is Helen's current fashion/science collaboration. This latest project has the power to change the way we live in a very fundamental way. In collaboration with Professor Tony Ryan OBE, PVC for the Faculty of Pure Science at the University of Sheffield, and his team, Helen has discovered a new way of cleaning the air we breathe by applying a catalyst to the surface of a textile that can remove toxins. "Herself" represents the first artistic elucidation of the Catalytic Clothing concept which is still in the research and development stage, but that hopes to become a reality within the next decade. "Herself" is an exquisite floor length 'catalysed' couture dress embedded with catalytic elements, in short the world's first air purifying dress.

Catalytic Clothing is a radical project that brings together the worlds of fashion and chemistry with the potential to clean the air we breathe. Employing existing technology in a new way, it seeks to explore how clothing and textiles can be used as a catalytic surface to purify air. It is the brainchild of artist and designer Professor Helen Storey and chemist Professor Tony Ryan – people from very different worlds whose minds have come together in highly successful art/science collaborations.

"Herself" – The World's First Air purifying dress

Herself represents the first artistic elucidation of the ground breaking Catalytic Clothing concept. It is a work created by Helen Storey and produced by Caroline Coates. Helen is based at London College of Fashion and Caroline at the Helen Storey Foundation and the London College of Fashion.

The piece is a floor length 'catalysed' couture dress, created by Helen Storey and embedded with generation 1 catalytic technology, and is in short 'the world's first air purifying dress'. This was displayed as a pilot in Sheffield in 2010 between October 11th to 29th in association with the University of Sheffield and Sheffield City Council.

It is intended to show the public how this technology can work and is an inspiring example of an artist and a scientist collaborating for a world first, which can lead to a real environmental and health solution. A film starring Erin O'Connor, directed by Adam Mufti working with Helen Storey further visualises this concept.

"Field of Jeans"

"Field of Jeans" is the second artistic intervention in a series of Catalytic Clothing events for the general public. We have chosen to produce a 'field of jeans', as most people own such a garment, to illustrate the potential everyday use of this concept. This installation elucidates the impact of Catalytic Clothing in years to come.

"Field of Jeans" mysteriously appeared overnight. Looking like an array of terracotta solders, this small crop is embedded with the catalytic technology and constructed in torso-less rows for the public to discover. Jeans donated in a 'jeans amnesty', has a strong visual impact and aims to be an emblem of the ease with which change can be effected if we all work together.

Introduction

A double award-winning Wellcome Trust supported Sci-Art project, **Primitive Streak** was created by Helen Storey, a designer based at the London College of Fashion and her sister Kate Storey, a Developmental Biologist at the University of Dundee.

The two collaborated in 1997 to create a series of fashion/textile designs, spanning the first 1,000 hours of human life. Producing these at London College of Fashion, Helen and Kate worked interactively using design at multiple levels to evoke the key embryonic processes that underlie human development.

Seen and acclaimed by millions internationally and called a 'cultural hybrid', it changed the course of Helen's career - her time is now devoted to ideas and work rooted in science. Kate remains dedicated to the public understanding of science.

In 2011 the Wellcome Trust have supported the further development and re-launch of Primitive Streak, which is accompanied now by new designs inspired by lung development and a website that marries up each design with introductions to the underlying biology, as well as links to cutting edge research in Developmental Biology.

Locations

1. Atrium of Newcastle Central Library – Lung dress
2. Centre for Life – Primitive Streak (including black lung dress)
3. Newcastle University – "Herself" (Kings Gate)
4. Newcastle University – "Field of Jeans" (outside Northern Stage)

Primitive Streak

A double award-winning Wellcome Trust supported Sci-Art project, Primitive Streak was created by Helen Storey, a designer based at the London College of Fashion and her sister Kate Storey, a Developmental Biologist at the University of Dundee.The two collaborated in 1997 to create a series of fashion/textile designs, spanning the first 1,000 hours of human life. Producing these at London College of Fashion, Helen and Kate worked interactively using design at multiple levels to evoke the key embryonic processes that underlie human development.Seen and acclaimed by millions internationally and called a 'cultural hybrid', it changed the course of Helen's career - her time is now devoted to ideas and work rooted in science. Kate remains dedicated to the public understanding of science. In 2011 the Wellcome Trust have supported the further development and re-launch of Primitive Streak, which is accompanied now by new designs inspired by lung development and a website that marries up each design with introductions to the underlying biology, as well as links to cutting edge research in Developmental Biology. 11 of the 27 dresses have been brought to Newcastle as part of the Newcastle Science Festival.

It is testament to the strength of the original concept that the work continues to inspire and grow.

Sperm Coat: Nylon, cotton

Fertilisation involves the fusion of one egg from the mother and one sperm from the father to create a new human being. The fertilised egg is therefore a single cell that contains genetic information, half of which comes from the mother and half from the father. On fertilisation this one cell becomes an embryo and so begins the process known as development.

This coat took 105 hours to embroider with nylon and cotton threads onto dissolvable fabric. It was then soaked in cool water, allowing the backing cloth to fall away to reveal the fabric shown.

Cell Division/Anaphase dress: Silk, mirrored paper, viscose jersey

Following fertilisation, the single cell splits into two and then into four cells and so on. This process is known as Cell Division. First, cells copy their genetic information or "genes" and these are then shared equally between the two new cells. Genes are made of DNA and are located in the centre of the cell in the nucleus. During cell division they appear as finger-like structures called chromosomes.

The floating breastplate of the dress shows pairs of chromosomes pulling apart as a cell divides. Red fringing is a reminder of the spindles along which the chromosomes are drawn.

White/Black implantation dress; Silk jersey, silk chiffon

After initial cell division, the embryo moves to the womb where it embeds. This process is called implantation.

Implantation and subsequent development of the placenta enables the embryo to obtain nutrients and oxygen from the mother. The embryo also passes carbon dioxide and other waste products to the mother via the placenta

The white part of the dress has been embroidered to show the embryo implanting into the uterus wall (black).

Primitive Streak Dress: Hand printed African cotton, metallic mesh, plastic, fibre-optic threads

Our internal body organs and tissues, such as muscles, heart, kidneys and backbone, are made from a special cell layer called the mesoderm. This forms in the 2-week-old embryo from a unique structure called the Primitive Streak.

The Primitive Streak is represented by two sheets of metallic silver cloth which feed into the central black groove at the back of the dress. A sheet of gold metallic fabric then indicates the mesoderm emerging between them. Rounded black plastic represents the top of the Primitive Streak.

Heart Tube Hat: Nylon/straw

Heart development begins very early and involves the formation of two simple tubes. These fuse together, bend and fold to form the heart on one side of the body.

Helen and Kate decided that in this instance a hat would better explain the development of the heart than a dress so asked the milliner Philip Treacy to come up with a design. His finished piece shows the two blood vessels coming together and the developing diaphragm beneath.

Heart Bird dress: Non precious feathers, nylon mesh

The folded heart tube now begins to be sub-divided into four chambers and blood begins to flow through them. It enters the first chamber on one side of the heart and is pumped from the second chamber to the lungs where it gives up carbon dioxide and picks up oxygen. It then returns to the other side of the heart passing through two further chambers, the last of which now pumps it round the rest of the body to deliver oxygen to all our tissues.

The heart bird was created to illustrate the fully folded heart tube. It is balanced by a feather tail. The heart itself has been made in the same way as above and is held in shape from the inside by fine nylon wires.

White Fake Fur Neurulation Dress: Nylon

The central nervous system forms in the early embryo from a flat sheet of cells, called the neural plate. This rolls up to form a tube that will develop into the brain and spinal cord. This process is known as neurulation.

The dress is made of white fake fur. The shapes on the back depict the rolling up of the neural plate. The developing somites, which will form the vertebrae of the backbone, are shaved into the fur flanking the neural tube.

Limb development Dress: Cotton canvas, oil paint

In the early embryo the arms and legs have yet to form. This begins at around 6 weeks, when they develop from four outgrowths or buds. The two upper buds will form the arms while the two lower buds become the legs.

This dress, made of artist's primed canvas, was painted in oils to show the digits forming within the expanding buds, by Chloe Sendall.

Professor Helen Storey – February 2011

“Back in 1996 a Wellcome Trust leaflet sent to me by my sister changed my career for good. Primitive Streak was our collaborative answer to bringing her world of developmental biology, and mine, of fashion, together, and it has been touring virtually non stop ever since; almost unheard for a fashion/textile collection or body of work like this. In 2010, the Wellcome Trust once again invested in the work so that we could add a new dimension and it could tour further. The new piece elucidates the development of the lungs and it has been a challenge and a labour of love to get it to exist.

The test has been in part practical; trying to find a way for the new piece to belong to the original collection, whilst at the same time adding something that reflects now – from an artistic perspective. It has at times felt akin to asking a writer to add a new chapter to a book that was creatively finished 14 years ago. I have been unexpectedly surprised how powerful a challenge it has been. This opportunity has presented enormous positives. We have been able to work on new educational material (in 1997 we had no idea of the impact, or demand there would be for this) and the new fashion images generated are the best way to re experience the whole work with totally fresh eyes. I'm truly excited at meeting the audiences who will encounter this work now, as well as those who have come across it before and want to re experience it again anew.

The introduction to Kate's world was the beginning of an adventure into the world of science far more broadly, and it has added a depth, richness and meaning, that working in the commercial world of fashion did not provide. In the years since Primitive Streak was first created, I have worked on four other art/science collaborations and I feel that the experiences have literally changed the way my mind works, rather like one might look back at yourself aged 7 and wonder how you got to be who you are today.”

Helen Storey, Designer based at the London College of Fashion and her sister Kate Storey, a Developmental Biologist at the University of Dundee.

Professor Kate Storey – February 2011

“Creation of the original "Primitive Streak" exhibition had at its centre the interactions between Helen and I, as artist and scientist. It was an organic process, which involved Helen looking down microscopes and experiencing embryonic development as it happens. Witnessing this process and discussing the mechanisms that direct the generation of our bodies gave way to imagining how key events might be distilled and communicated. This was the hardest part, to leap from knowledge to representational designs that, if they were to succeed, had to stand in their own right as works of art.

When we were asked to extend "Primitive Streak" by adding new designs, I felt we were also now in a position to develop on-line scientific information about the developmental events that inspired each piece. This would follow up the many educational projects "Primitive Streak" has inspired with over the years, working with both arts and science students and teachers. The designs are now married up with a plain text description and movie of the biological process they evoke. The site also provides a lay account of underpinning developmental mechanisms, links to further information and also to laboratories working at the scientific cutting edge. A third section overviews what happens when these developmental processes go wrong.

Working in this hybrid space between art and science has its challenges. The work immediately launched important scientific terms out on to the high seas of the fashion world and I was concerned that they would lose their meaning. What has grounded the exhibition over the years is the demand to know more from its audience, the unexpected questions from observant school children that show their curiosity about the biology is piqued. I think "Primitive Streak" works because it is not didactic, but an expansive celebration of our embryonic origins which aims to engage a young and enquiring next generation.”

Kate Storey 21st February 2011

Thank You's

Marissa Buckingham, Amy Carter, Matthew Holley, Mark Krasnow and Ross Metzger of Stanford University USA, Terry McCartney, Nature Magazine, Deidre Pashley, Kees Weijer and Jason Swedlow of the University of Dundee for movies, Claire Willis, Anna Wraith, Dr Shona Gray, Dr Sarah-Jane Gibb, Terry McCartney and the Centre for Life.

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Fashioning Science

A journey from Primitive Streak to Catalytic Clothing

A unique collaboration blending science with high fashion…