

Virus

Bad News Wrapped in Protein

Curated by **Shirley Wheeler**

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Science doesn't exist in isolation from social, political and cultural contexts....

James Peto, curator of the Wellcome Trust Gallery, London.

Acknowledgements

As with all projects of this type it is the collaborative support of many individuals who bring ideas into reality. I would like to thank everyone involved for their substantial input and their individual creative vision and hardwork. It is always an enormous pleasure to work alongside so many talented individuals.

Thankyou particularly to St.John's College, Oxford for their support and for providing such a beautiful venue. I hope that, Sir John Kendrew, St.John's former President, who in his own life saw connections between science, art and design, would enjoy this creative exploration of Viruses. Thankyou to Sophie Peterson of St. John's for her untiring hardwork and support. To Dr. Jason Snell for his expertise, interest and enthusiasm.

To colleagues at the University of Sunderland, Prof Tony Alabaster of the Faculty of Applied Science, Prof Brian Thompson of the Faculty of Arts, Design and Media and to all the staff who gave their time and expertise to make this exhibition possible.

Thankyou to Flavia Swann, Emeritus Professor of Art and Design who has brought a long standing wealth of knowledge and experience across a broad range of disciplines. Finally, to Mark de Pienne for his support which made this exhibition a reality.

Foreward

This exhibition, *Virus: Bad News Wrapped in Protein* is a fascinating exploration of visual and aesthetic responses to the power of viruses. Viruses have and still have a huge effect on both human, animal and plant life. On the one hand they are to be feared by the individual who is told by their doctor that they have a virus and that there is no drug to deal with it, only the body's immune system, on the other hand, at a national and even international level where avian 'flu threatens to become a pandemic as the virus in 1919 did killing more people after the war than during the war. As viruses mutate each year there is a new 'flu to bring alarm, and with global travel no country is immune.

Academic disciplines have over the years divorced themselves from the interdependence of exploration as witnessed from the Renaissance to 17th century, when for instance, science and art went hand in hand (Leonardo), as did science and philosophy (Newton), by the 20th century science had become such a specialist field with many subdivisions just as art and design had become too. Equally because science has become such a specialised field the public find it quite inaccessible, though able to marvel at its achievements without any comprehension of the route to that achievement.

This exhibition builds on the success of the Design4Science research project, an exhibition supported by the Wellcome Trust, also led and curated by Shirley Wheeler, Reader in Design at the University of Sunderland. It was shown in Manchester, Sunderland, Cambridge, the Noble Museum Stockholm, the Medical Museum Copenhagen and the University of Porto, Portugal and explored how to communicate the wonders of Molecular Biology through visual artistic media of various kinds. This exhibition, however, investigates through artistic means our psychological and physical reactions to the presence or contemplation of viruses, thus attempting to bridge the divide between art and science and stimulate our comprehension of how viruses operate.

Flavia Swann
Professor Emeritus

August 2011

Introduction

This exhibition features work by designers and artists inspired by the science of viruses. It seeks to challenge the negative and disquieting public image of viruses generated by press coverage of viral outbreaks, such as swine and avian flu. Setting aside fear and sensationalism, the designers in this exhibition gently explore ideas ranging from the mathematical beauty of viral structures and their function, to the way people try to set themselves apart from the impact of viruses. The exhibition's multidisciplinary approach gives a breadth of perspectives that reach beyond materials and conventional creative boundaries. This visual feast of calligraphy, illustration, sculpture, glass and ceramics, photography and interactive design is curated by Shirley Wheeler, Reader in Design at the University of Sunderland.

The glass sculpture of Rennie and the ceramic work by Van Essen encourage a vision of beauty in things that maybe deadly. Rennie's glass shapes are intricately woven into a regular web of suspension wires. The grid appears to intersect the virus structure in an ordered manner, reminiscent of the methodology and investigative technology used in the process of scientific discovery of the virus form itself. Van Essen's ceramic forms are disrupted and break through layers of porcelain, a material more commonly associated with domestic tableware.

In the work by Richardson, a touchable, reactive surface responds to individual user interaction and the lattice like pattern echoes an ordered molecular-like structure that is disturbed and distorted on user contact.

Plouviez's contemporary photographic portraits of women wearing surgical masks, disrupts the images of the women and our usual response to the idea of a portrait in a domestic setting. Robinson's work is historically referenced and echoes the fears that gave rise to the medieval masks and the ineffectual methods employed in the vain hope of protection against the plague virus.

Collier's work, based around walks through Tyne and Wear brown-field sites, celebrates the scent and colour of the wildflowers encountered, which are pollinated by bumblebees. It draws attention to the 'plight of the bumble bee', where viruses and loss of habitat are devastating bee populations. Thompson's work is also rooted in the landscape and human interaction with it and tracks the spread of viruses through the topography of the landscape.

Clayton, Ling and Wheeler explore words and metaphors. Clayton visualized letters at the same time as holding in his mind the curved triangles that make up icosahedron-like shapes, the platonic form that creates the spherical structure of a number of viruses. Ling used patterns formed through burning paper with molten glass to touch upon the devastating impact viruses can have. Wheeler takes as her starting point the brief telegrams of the First World War that brought such heart breaking news and damaging consequences to families. Wheeler entwines the warlike metaphors often used by scientists in their descriptions of viruses and viral envelopes. In another of Wheeler's illustrations the, 'virus of contemporary economic crisis' is referenced back to the 'Tulipomania' of the 1630's, when a mosaic virus gave rise to highly prized striped tulips. The long propagation period of tulip bulbs encouraged traders to sign contracts before a notary for the bulbs, perhaps the first "futures market" in Europe.

Finally the work of three recent graduates offer examples of the way that art and design research can influence curriculum and the work of a new generation of artists and designers.

Semper augustus, the most highly prized Tulip of the 17th century Tulipomania period, caused by a mosaic virus.





Work which explores the disruption of a body through viral infection....

Tamsin van Essen

Van Essen's work conveys the idea of a host being taken over and eaten away by a parasitic virus. Using sandblasting, an aggressively destructive process, to mimic the action of the virus attacking a body, which is contrasted with the clean geometric forms. This highlights the erosion caused by the creeping spread of the virus. The perfect porcelain forms are attacked to expose their inner strata, at the same time creating a delicate vulnerability in the shape.

Van Essen work considers the question of whether something deadly can also be beautiful. Despite their sinister nature, when viewed in electron micrograph images, viruses have elegant aesthetic qualities and the patterns they form in their evolution can appear highly decorative. This decorative geometry has been applied to porcelain, which tends to be used for domestic decorative ware. The work shows the extreme nature of the virus by taking the patterns out of control, until it causes a breakdown of the form.

Tamsin van Essen

Tamsin van Essen is a British ceramic designer living and working in London. She is a graduate of Central Saint Martins College of Art and Design.

Tamsin comes from a scientific background, with a degree in Physics and Philosophy from Balliol College, Oxford. She specialises in conceptual design and has recently been using the medium of ceramics to explore scientific and medical themes. Material experimentation is a strong characteristic of her work, probing how the material qualities of ceramics can be altered through unexpected additions, and using creative intervention into standard industrial and craft production processes.

Her work sits at the interface between art and design, with one-off collectables and conversation pieces. She has exhibited extensively throughout the world, including at Sotheby's, Pierre Bergé, the Saatchi Gallery, Design Miami, the Nobel Museum and other prestigious international locations. Her work is included in the permanent collections of the Wellcome Collection, the Royal Pharmaceutical Society Museum and the Montreal Museum of Fine Arts.



A virus is genetic material without a cell of its own...

Viruses come in many shapes and sizes but the basic design has the genetic material (nucleic acid – DNA or RNA) contained within one or more protective layers of protein and possibly also membrane. Smaller viruses are often highly symmetrical. Viruses need to take over a host cell because they cannot reproduce on their own. When a virus comes into contact with a host cell, it can insert its genetic material into the host, literally taking over the host's functions. Viruses hijack cells of humans or other species, including plants, fungi and bacteria, and trick them into producing new viruses that can then invade other cells.

Outside the cell, the virus is metabolically inert; and even inside the host cell, the virus can sometimes remain dormant for long periods, causing no obvious change in the host cells. Because of this we say that viruses are genetic entities that lie somewhere between living and non-living states. When a dormant virus is activated, new viruses bud out of the host cell, sometimes bursting and killing the cell, and go on to infect other cells and hosts.

Current concerns focus on possible pandemic flu. These viruses contain 3 proteins in their envelope:

- Haemagglutinin, Neuraminidase, & M2 Proton Channel.

Haemagglutinin is a deadly molecular machine that targets and attacks cells; it is a spikeshaped protein that extends from the surface of the virus. It has two key roles: it binds the virus to cells and infects these cells by fusing with them. Haemagglutinin has been likened to a key that allows the virus entry into only those cells with a compatible lock.

Neuraminidase helps to release new copies of the virus from infected cells. This protein is the target of many antiviral drugs.

The M2 proton channel protein is the third protein found on the outer coat of a virus. It is involved in exposing the contents of the virus inside of the infected host cell.

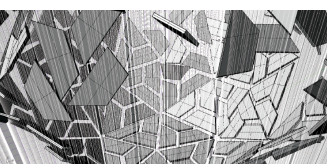
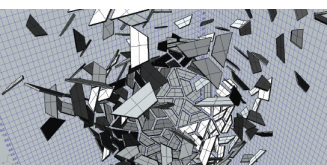
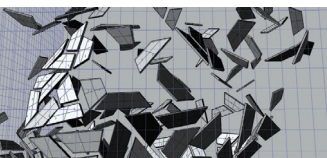
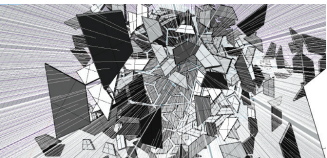
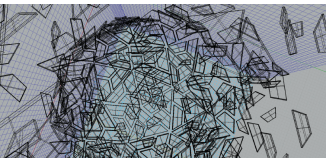
An important part of World Health Organisation surveillance is worldwide monitoring of viruses which usually only affect animals. Scientists look for changes in the haemagglutinin that might help the virus to bind to human cells. To use the lock and key metaphor, scientists hope to be able to predict if an animal virus develops a key that fits a human cell.



Rapid prototype model of Hepatitis B. HBV infects more 350 million people of which 1 million die annually.

The capsid is a biological, structural and mathematical marvel....

Colin Rennie

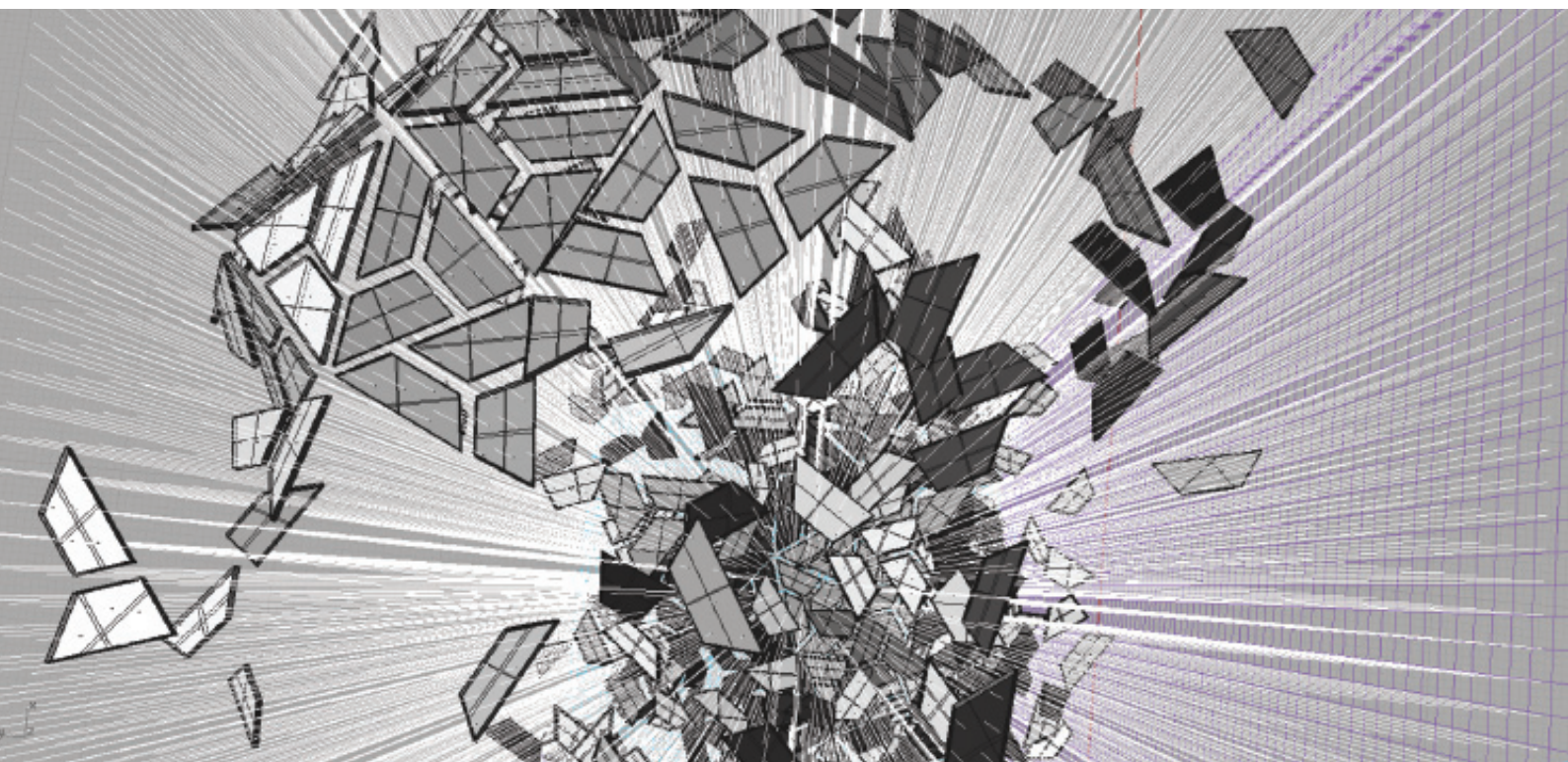
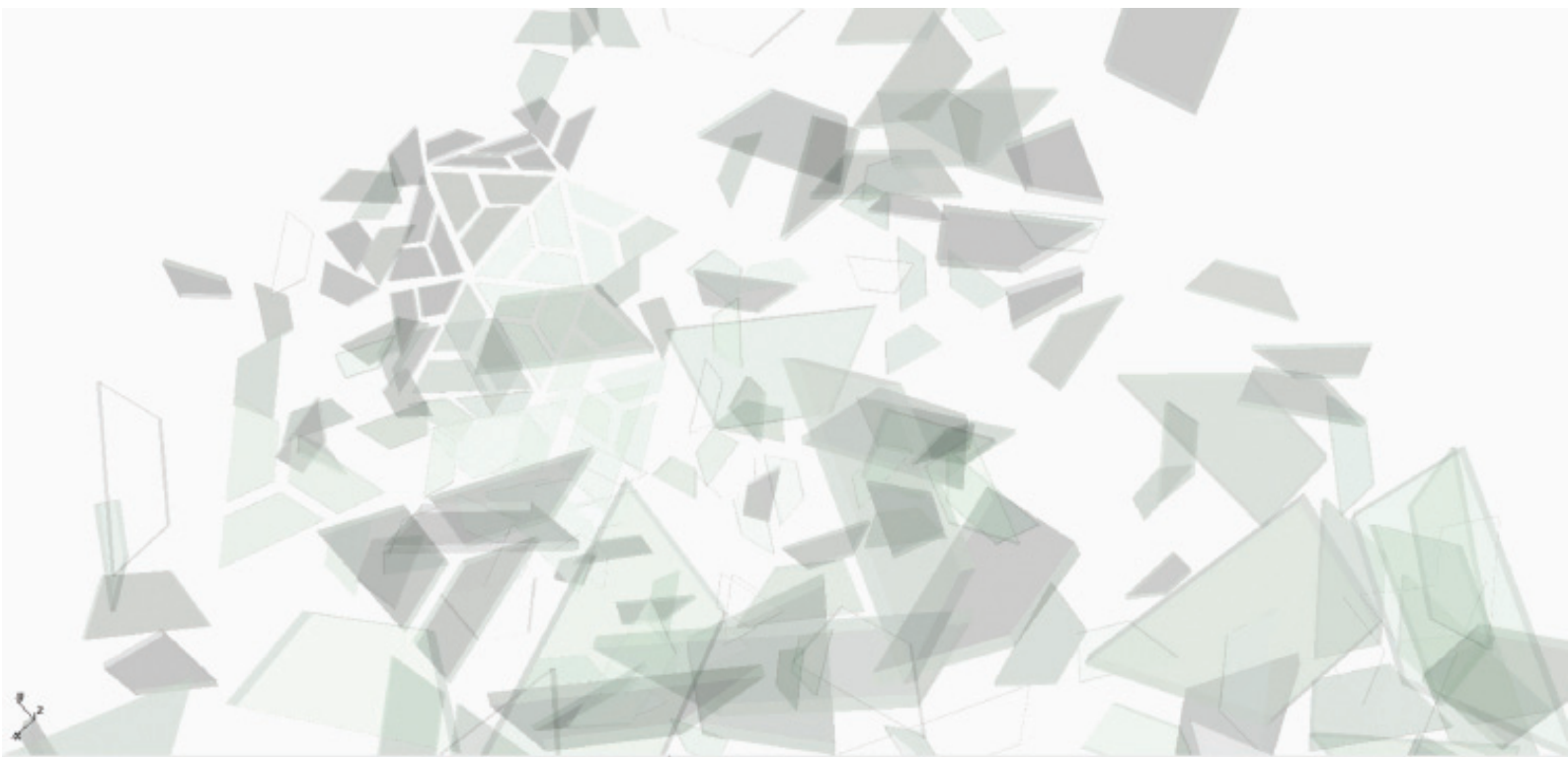


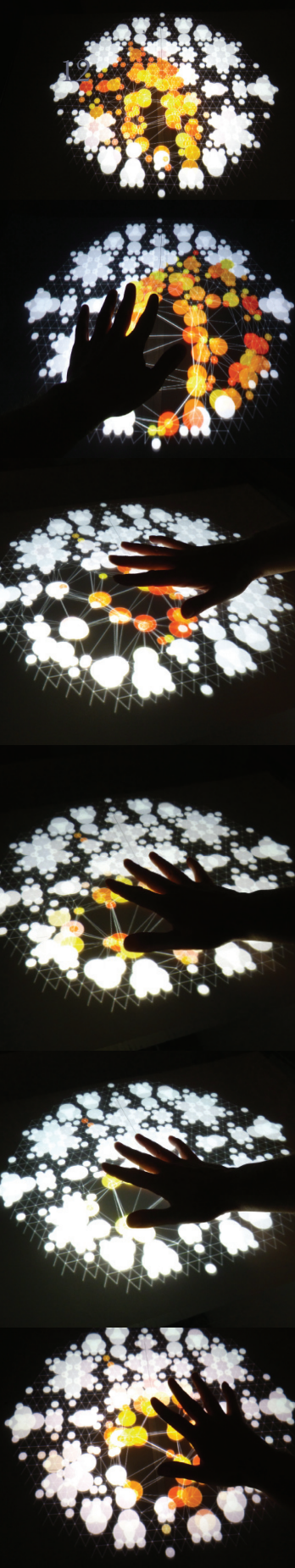
The work outwardly presents a model of a viral capsid in the process of self assembly or disassembly. From a cloud of subunit elements the viral capsid is held half completed or half disassembled. Water-jet cut optiwhite glass is cut for the subunit elements, which are suspended amid a grid of vertical nylon wires, tensioned between two square plates of perspex one at relative ceiling height and one at floor level.

The grid structure of vertical suspension wires is integral to the technical assembly and to the aesthetic of the work. The grid appears to intersect the protein subunits and the viral capsid in a regular and ordered manner, reminiscent of the methodology and investigative technology used in the discovery of the process and viral form itself. However, the density of nylon wires in the grid is kept relatively high, 2500 wires, so that they interfere visually and become part of the form itself. This mesmerizing structure celebrates not only the mathematical complexity of the form and its processes but the viewer engages with the structure through a mist which implies there are mysteries still to be uncovered.

The concept and intention of the work is to present a model which seeks to celebrate Viral capsids. The capsid is a biological, structural and mathematical marvel which is highly sophisticated and can be used creatively for the enhancement of human life through the engineering of better drug delivery methods. Rennie presents an art work which explores this marvel and suspends it for viewing within an introspective grid.

Structural drawings for the glass artwork, created in Rhino software.





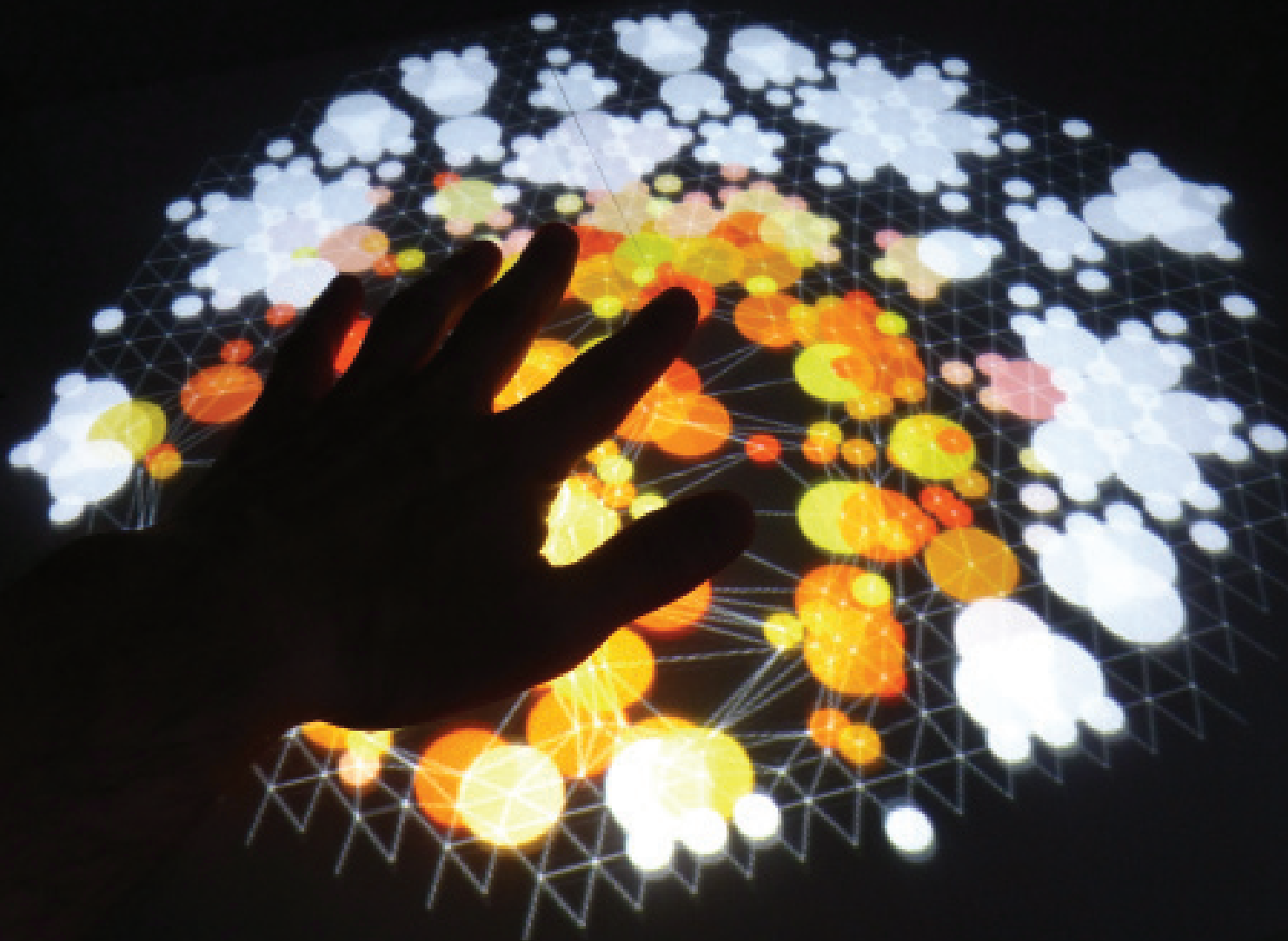
An agent which disrupts and alters molecular and digital structures....

Dr Andrew Richardson

Working from the basic idea of a virus as spread by a network of human contact, the work here seeks to visually explore this theme by creating a touchable, reactive surface which remembers and responds to individual user interaction. Contact with the surface of the table creates distortion and interference within the visual form, reflecting the idea of the virus as an agent which disrupts and alters molecular and digital structures.

Andrew Richardson

Dr Richardson is programme director for BA(Hons) Design: Multimedia and Graphics course at the University of Sunderland. His background combines both academic and practical interactive design. His research activities focus upon the use of computation as a creative material, linking the process of creating, using code, with traditional decorative design work. His doctoral work examined the use of computation within the context of creative practice, exploring the process of using code as a way of 'making' with the 'raw material' of programming language. He has exhibited and presented digital interactive artwork in exhibitions and festivals both nationally and internationally.



An inadequate attempt to separate ourselves from those around us...

Prof Arabella Plouviez

This work explores the virus through the photographic portrait. As we hear about epidemics and pandemics which globalisation has enabled to spread with ease, our 'diseases of modernity' such as SARS, avian and swine flu threaten to disrupt our modern world. A common personal response, in the main inadequate, becomes a simple mask, an attempt to separate ourselves from those around us, whilst not being able to do that physically.

The photographic portrait traditionally attempts to provide the viewer with an insight into the person who is being photographed. In this work the subject is wearing a surgical mask, not in the expected hospital or medical environment, but in the apparent safety of the domestic, making a connection between subject and viewer more difficult.

Arabella Plouviez

Arabella Plouviez is Professor in Photography and leads the Photography Department at the University of Sunderland. Arabella has been a practising photographer for many years, and she has exhibited and published both nationally and internationally. Her work involves the combining of image and text to visualise ideas and issues and confront some of the inadequacies of the photograph. She often works with communities who are under-represented within the mainstream, giving voice to people who are frequently unheard. In *Deviant Woman* (pub. 2008) the photographs are concerned with looking at the ways in which women are represented and the impact that some styles of photography have had in defining women within contemporary society with specific reference to insanity and criminality. Her current work looks at the representation of Alzheimer's Disease, incorporating scientific imaging of the disease and the experience of the sufferer.



Sean Robinson

Combining the forms of a late Middle Ages plague doctors mask and a contemporary military gas mask the viewer is invited to believe that this mask is a genuine artifact used in the prevention of disease transmission.

The material chosen is lead, which in this mask is both an attempt at a preventative barrier and a poison, the smell of herbs and iconic form combine to create feelings of ambiguity. The mask challenges our belief in the power of imagery, herbal medicine and human ingenuity in an increasingly complex and globalised world. Today, faced with pandemics which may change the course of history, we are invited to think again about virus transmission and perhaps to re-evaluate the assumptions we might make about our future.

Robinson, a graduate of Environmental Sculpture started his professional career in Fine Art restoration, specialising in ceramics and stone. This led him to form his own company 'Alchemy' which focused on producing models for advertising photography.



Rome 1656
Physician attire



The Plight of the Bumble Bee....

Dr Mike Collier

Collier's work explores the interrelated nature of ecological and cultural ideas through a detailed study of local environments and (through walking) our embodied engagement with 'landscape'. Although much of his work 'takes place' in rural environments, he is very aware that the landscape through which he walks has been shaped by human intervention – it is not 'wild', a fact that is often clearly indicated by the flora and fauna seen, heard, smelt or touched.

Working with the Old English and local dialect names came about partly because he had always had an interest in the naming of flora and fauna, and partly through his exploration of the philosophy of Merleau-Ponty and the writing of David Abram with respect to language. Merleau-Ponty suggests that language should be grounded in the visible, audible world rather than use it to reduce nature to a human convention. David Abram says that ...

"If language is born of our carnal participation in a world that already speaks to us at the most immediate level of sensory experience, then language does not belong to humankind but to the sensible world of which we are but a part."

The words that Collier uses are a poetic reminders that an understanding and feeling for the natural environment was there in the language ordinary people used – these names are what local people called the birds and wildflowers; names that reflect more closely than scientific nomenclature, either the look, sound, scent, use of the flora and fauna.

CAT'S LOVER

WITCHES THIMBLE

LIGHTNINGS

BATCHELOR'S BUTTONS

BUMBLE-KITES

CHURCH BELLS

SLEEPING MAGGIE

BEE CATCHER'S

CUCKOO'S BOOTS

LOVE ENTANGLED

BEE BREAD

DEVIL'S PLAYTHING

TUZZY MUZZY

WEASEL-SNOUT

BEESOM

DRUMMER BOYS

PRINCE'S FEATHER

EGGS AND COLLOP

TEA CUPS

TOUCH AND HEAL

HEMMING AND SEWING

FITCHES

Collier's work for this exhibition, *Bad News Wrapped in Protein*, has taken a slightly elliptical view of the theme. On recent walks, he has encountered all of the six common species of bumblebees. However, aware that their population is declining – and that this decline in the number of pollinators will have serious implications for our environment as well as serious economic implications.

BANATHAL

COCKENO

SNOXUM

TWADDGERS

PAIGLE

As Chrissie Giles says, 'we all know that bees make honey, but they do much more for the food we eat. Bees (and other insects) including wasps and hoverflies, pollinate plants ... for some crops, such as melons, no pollinators means no fruit. For others, no pollinators means a lesser harvest. This widespread role of insects in food production is reflected in insect pollinators' economic value – estimated to be around £130bn globally in 2005.'

HISKHEAD

One of the main reasons for the decline in the wild bee population would appear to be a variety of viruses, some of which are capable of quickly destroying whole colonies. The Insect Pollinator's Initiative is setting out to understand the threats posed by viruses better, however, one thing seems clear - Professor Jane Memmott from the University of Bristol says that 'if bees are not properly fed, then they're more likely to catch diseases'. At a basic level, if we can provide our bees with a better habitat – a wild flower rich environment with a bountiful supply of pollen – then they will be better 'protected' from the viruses that threaten them.

QUILLET

TASSEL

HUGGABACK

In producing this work, the artist hopes, in a small way, to help to raise people's awareness not just of the fact that our population of bees is declining at an alarming rate, but that we, as well the scientists, CAN do something about it. If people put in the flowers, the bees will find them...

SWINNIES

KATTAKLU

Mike Collier

GRIGGLES

Dr Mike Collier is a lecturer, writer, curator and artist. He studied Fine Art at Goldsmiths College before being appointed Gallery Manager at the ICA in London.

GOLLAND

He subsequently became a freelance curator and arts organiser, working extensively in the UK and abroad. In 1985 he moved to Newcastle to run the Arts Development Strategy at the Laing Art Gallery, where he initiated the Tyne International Exhibition of Contemporary Art. He is currently programme director of the Arts and Design Foundation course at the University of Sunderland .

CAMMOCK

OKERDU



Virus - a physical experience revealed through sculptural metaphor Prof Brian Thompson

Working from a map produced by the World Health Organisation from data supplied by the World Organisation for Animal Health, Thompson isolated 5 areas in Europe reporting occurrences of H5N1 avian influenza in poultry since 2003.

The sculptures start with tracing the map. This is cut in wood and becomes the top layer, colour coded by country of origin. This layer becomes a template, where with a pencil, a further layer is drawn and then cut by hand. The sculpture “grows” in this fashion - each layer becoming slightly larger because of the width of the pencil line. This is the sculptural equivalent of an evolutionary process affected by the history of its own making.

Thompson explores in a sculptural way something of the way evolutionary processes enable viruses to evolve and change and how in new forms they become “events” - pandemics - linked to place and time.

Brian Thompson

Professor Brian Thompson graduated from the University of Newcastle in 1975 with an MFA in Sculpture. He has been awarded numerous prizes including: the Norwich School of Art Fellowship, the Pernod prize and the Peter Stuyvesant Art prize. His work has been disseminated through exhibitions and lectures in Europe, USA, and Asia including; The Condition of Sculpture, Hayward Gallery London; The Paris Biennale; The British Art Show; Sculpture Trails Museum, Indiana; the House of the Artist Moscow and the Guandong Museum of Art, China.

He is interested in how journeys inspire and explore landscapes, man-made or otherwise; how paths get worn, compress and build up over many generations. These journeys show the topography of the world, reveal something of its history and give insights into how we come to know and navigate.

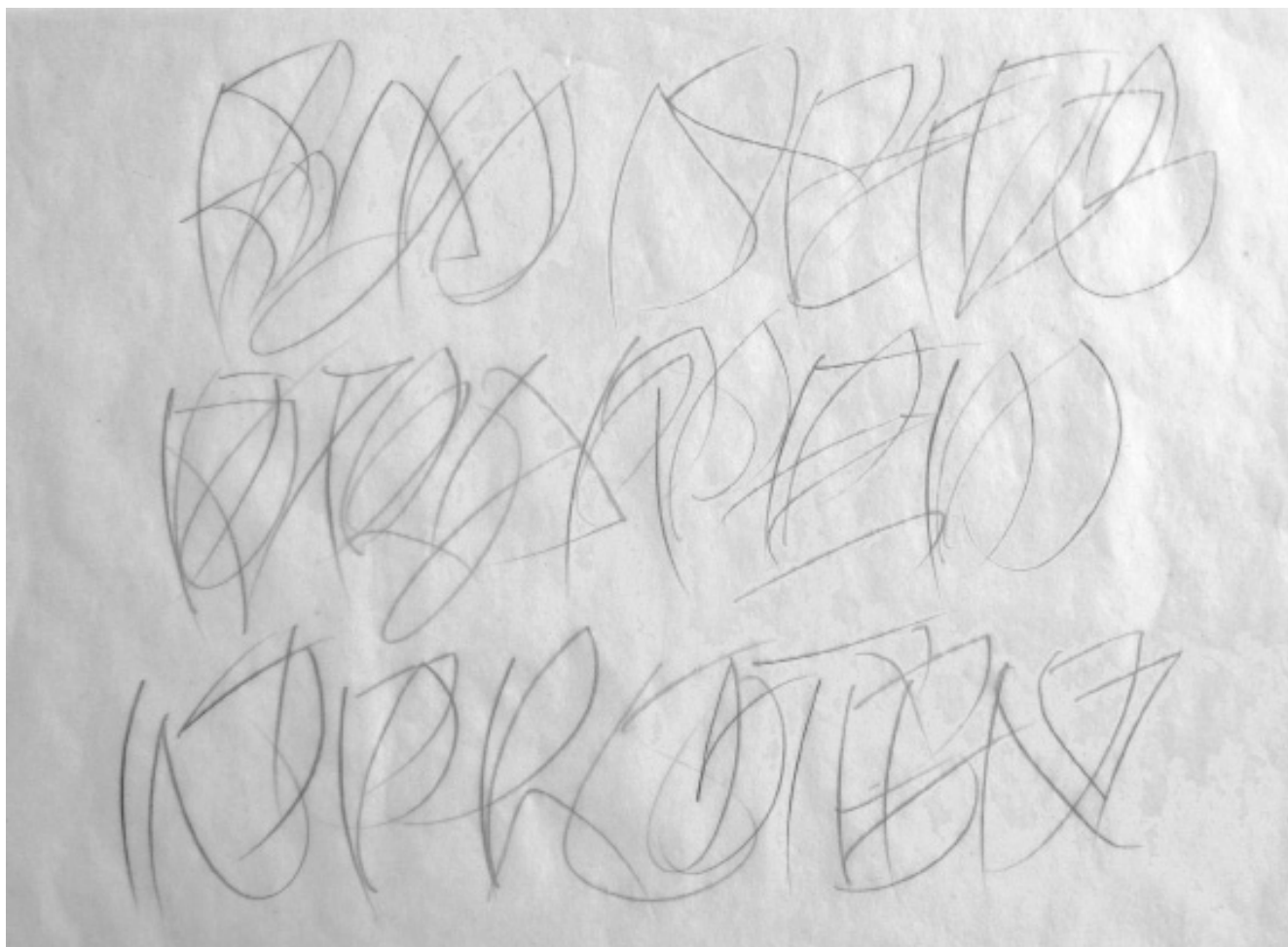


What kinds of transformations and interactions are possible between such imagined structures..... Prof Ewan Clayton

Clayton's calligraphic imagination has set to work within the structure of a virus. He has taken a form, the letters of the alphabet spelling 'Bad news wrapped in protein' and visualised the letters at the same time as he held in his mind the curved triangles that make up an icosahedron-like shape. The shape that lies behind the spherical structure of a number of viruses. He imagined them constantly disassembling and reassembling themselves as dynamic structures, building new letterforms as they went along. Clayton describes this work as a type of pure visual research. Wanting to see what shapes might result, what kinds of transformations and interactions were possible between such imagined structures as he wrote. He wrote from top left to bottom right in one continuous sequence without pause.

Ewan Clayton

Ewan Clayton is a calligrapher who lives and works in Brighton, Sussex. For sixteen years he worked as a consultant to Xerox PARC, where his research explored the place hand-work has in a digital age. Ewan is currently Professor of Design at the University of Sunderland and leads the University's calligraphy course at Kensington Palace, London. The only formal qualification offered in calligraphy in the UK. His most recent book, *The Written Word: A History of Writing* will be published by Atlantic Books in August 2012.



A sense of beauty within their destructive force..Dr Manny Ling

These works use a new process called Pyrographic technique, in which hot molten glass is gathered and used as a drawing medium to create burnt marks on paper.

Traditional calligraphy is then applied to the work, responding to the aesthetics of the burnt marks. Ling said,

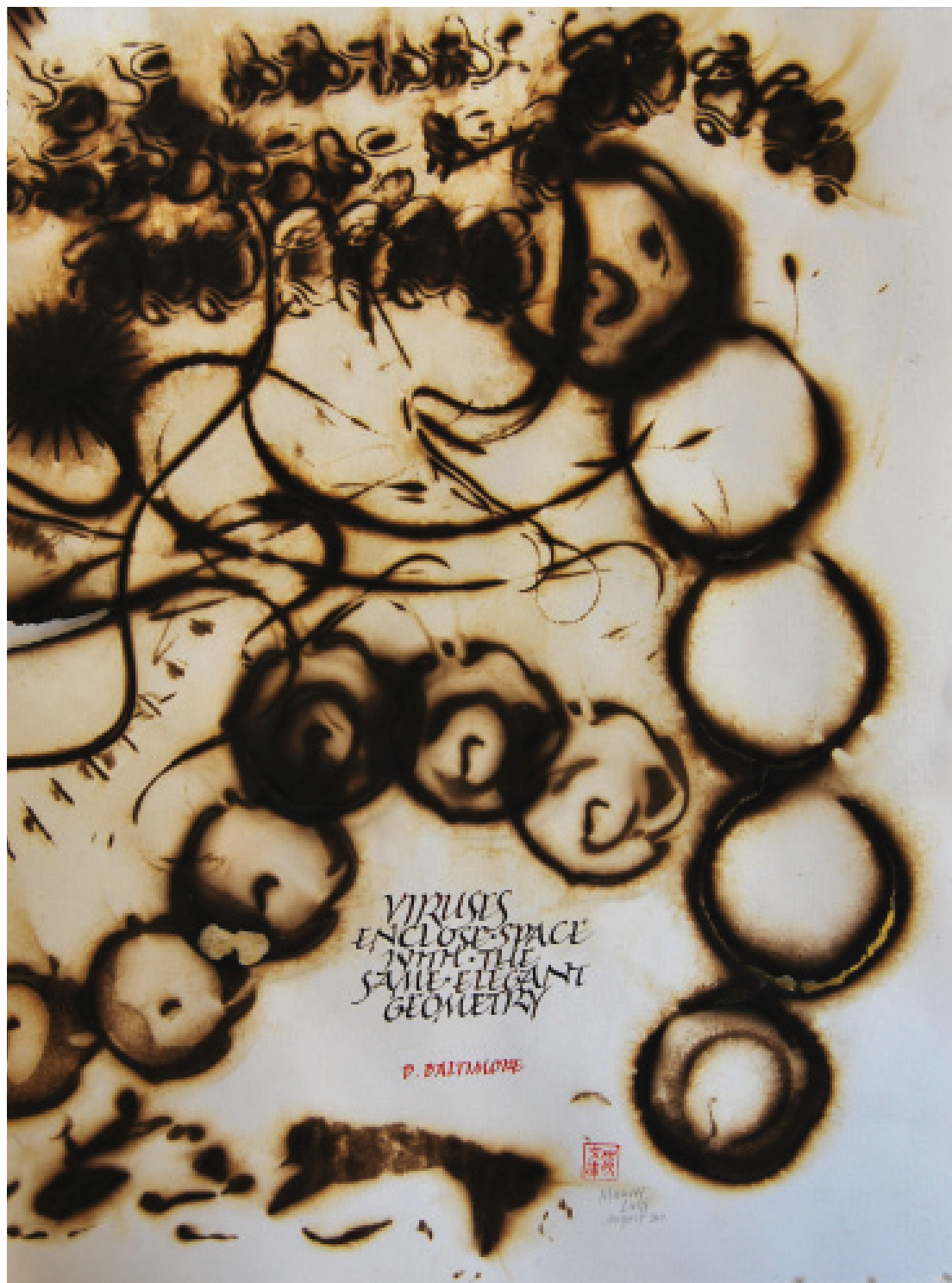
"I see this process as similar to the way a virus might work – it is potentially a very destructive and malevolent process. However, the marks are beautiful and evocative with a sense of beauty within their destructive force."

Professor David Baltimore, is quoted in Ling's work. He shared the Nobel Prize for Physiology of Medicine with Howard Temin and Renato Dulbecco in 1975, "for their discoveries concerning the interaction between tumor viruses and the genetic material of the cell." Baltimore's greatest contribution to virology was his discovery of reverse transcriptase. Reverse transcriptase is essential for the reproduction of retroviruses such as HIV.

Manny Ling

Dr Manny Ling is a designer, typographer and calligrapher. He is an honorary Fellow of the Calligraphy and Lettering Arts Society and is the editor of the International Journal of Calligraphy The EDGE.

He is currently a senior lecturer in Design at The University of Sunderland and is the programme leader for the Foundation Degree in Calligraphy with Design course taught in Kensington Palace, London and he co-ordinates and teaches on the suite of Postgraduate Design programmes. His research interests include the integration of cultural and philosophical contexts between the East and West and to apply these into calligraphic applications.



Virus - Bad News Wrapped in Protein

The forgotten bad news of 1918-20 flu outbreak...

Shirley Wheeler

Receiving a telegram is associated in many peoples minds with the brief information issued by the War Office announcing the loss of loved family members. One imagines the devastation in the eyes of the recipient as the envelope arrived. The metaphors used by scientists describing the impact of viruses and the 'viral envelope' as the harbinger of cellular bad news has a particular historical connection in relation to the First World War. It is estimated that the death toll of WW1 was 16.5 million but the Spanish flu pandemic of 1918-20 is estimated at 50 -100million, the largest recorded human disaster of all time. It is thought that people weakened through the ravages of



war surcombed more easily to the flu virus. Science is a part of our cultural heritage and making connections between scientific knowledge and social impact fascinates Wheeler and influences her work as an illustrator and as curator of this exhibition. Her previous project Design4Science supported by the Wellcome Trust explored similar themes. In this exhibition Wheeler also explores the work by the Nobel Laureate Harald zur Hausen and the connection he made between the Papilloma virus and cervical cancer, Wheeler visually connects the Papilloma structure with the work of the designer Buckminster Fuller. Wheeler also looks at the impact of the mosaic virus, which gave rise to 17th century Tulipomania and its financial impact. Science does not exist in isolation from social and cultural change and curating this exhibition Wheeler brings fresh insights to these connections through her own and the work of other artists and designers.

Shirley Wheeler

Wheeler graduated from Hornsey College of Art in 1978 with a degree in Graphic Design and Scientific Illustration and later from the Royal College of Art with an MA in Illustration. She worked in the art department of the Economist Newspaper, and then moved onto medical magazine publishing. Whilst working for Oxford Illustrators, she illustrated for most leading UK publishing houses. She has exhibited at the V&A's Bethnal Green Museum, enjoyed a Whitechapel Gallery residency and worked at the Medical Research Council's, Laboratory of Molecular Biology in Cambridge. In her professional life she has always worked alongside scientific specialists and this has influenced her research interest into the role of art and design in science communication. In 2005-2008 a Society Award from the Wellcome Trust established Design for Science, a project exploring Visual Communication in relation to Molecular Biology. Wheeler curated a large travelling exhibition, which was seen in Cambridge, Manchester, Sunderland, the Nobel Museum Stockholm, the Medical Museum Copenhagen and the University of Porto, Portugal. This was reviewed favourably by the journal Nature. She is currently Reader and Head of Design at the University of Sunderland.





Joe Robinson
Virus story book
Design graduate University of Sunderland



Karen Mabon
Virus brooch
Jewellery graduate Edinburgh College of Art



Kayleigh Young
Virus Neckless
Jewellery graduate University of Sunderland