

The Decoded Lab

Dr Sonja Andrew

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University of
HUDDERSFIELD
Inspiring global professionals



Project Description

This portfolio comprises two projects that interpret science history and innovation through textile practice. They explore the visual communication of scientific discoveries, developing visual strategies to make these accessible to non-specialist audiences to encourage them to engage with further information on the science and its wider impact.

Project Duration:

Project 1: 'The Fabric of Research' in collaboration with the Cancer Research UK Institute, Manchester: 23-29th July 2016 & 12th October 2016.

Project 2: 'Creative Labs: Biological Sciences 2nd Edition': 14th Jan-4th March 2019.

Funder:

Project 1: exhibition costs funded by Cancer Research UK (CRUK) Manchester Institute. Digital printing provided by the University of Manchester.

Project 2: £1,000 Creative Labs Award and £265 materials funding, from the Cultural Institute, University of Leeds.

Research Partners, consultants, collaborators:

Project 1: Sive Finlay, Public Engagement Officer, CRUK Manchester Institute. Steve Bagley, Head of Advanced Imaging, CRUK Manchester Institute, providing information on CRUK's scientific research to inform exhibition outcomes. Diane Griffiths, recruited for the project by CRUK, who shared her experiences as a cancer patient.

Project 2: Dr Lorna Dougan, Associate Professor and Director of Research and Innovation, School of Physics and Astronomy, University of Leeds.

Dr Anders Aufderhorst Roberts, Research Associate, School of Physics and Astronomy, University of Leeds.



Figure 1, from left to right: 'Signalling Networks', 'Writing and End to Cancer' and 'We've Come A Long Way' 1x1 metre silk twill scarves in colourway variations for the Cancer Research UK Institute, Manchester, displayed at 'The Fabric of Research', Manchester Craft and Design Centre, 23-29th July, 2016.

Research Aims & Objectives

Research Aims:

- The research in this portfolio aims to implement 'textile semantics' methodologies to generate textile outcomes for public engagement that convey how smaller scientific studies lead to, and from, major scientific breakthroughs.

Research Objectives:

- Project 1 objective: To utilise textile practice to engage the public with advances in scientific research made by CRUK researchers, presenting the textile outcomes in an accessible format through contextualisation in a fashion product exhibited in a non-scientific setting.
- Project 2 objective: To develop textile concepts as a creative response to bio-physics research, making links between the histories and contemporary practices of this scientific field.



Figure 2, from left to right: 'Signalling Networks', 'Writing and End to Cancer' and 'We've Come A Long Way' 1x1 metre silk twill scarves in colourway variations for the Cancer Research UK Institute, Manchester, displayed at 'The Fabric of Research', Manchester Craft and Design Centre, 23-29th July, 2016.

Research Context

Dr Sonja Andrew's research positions textiles within a communication paradigm, exploring the practitioner's role as encoder of meaning through textiles. Focusing on textile semantics, she explores content, cloth and context as multi-modal channels for the production and exchange of meaning between practitioner and viewer, examining authorial intention and viewer perception.

This focus continues in textile practice developed via two research projects exploring representations and interpretations of science. To inform this process, Thomas Kuhn's theories of episodic paradigm shifting in relation to revolutionary science (1962), and the accepted model of diligent sequences of closed parameter laboratory experiments as a route to major scientific discovery were considered. Were these dichotomous? Would collaboration with scientists working towards scientific breakthroughs enable an expression of both positions on the nature of scientific enquiry within an arts practice framework? Working with researchers from the Cancer Research UK Institute, Manchester, and biophysicists at the University of Leeds, these questions were explored, with 'textile semantic' methodologies implemented to create works for public spaces that communicate how smaller scientific studies lead to, and from, major scientific breakthroughs. Whilst the work of these researchers formed the catalyst for the textile practice, the researchers themselves were also 'viewers' within the context of these projects. They fulfilled a dual role of both content provider and 'informed audience', becoming part of the cycle of 'reflection in action' (Schon, 2000; Getzel & Csikszentmihalyi, 1976) that informed the development of the textile work by the practitioner. Their reactions to the aesthetic results that evolved from the creative interpretation of their research provided intermediate perceptions on the meanings generated, enabling reflection on the communicative, material and aesthetic components of the textile practice, to inform development of the work prior to presentation to the public. Both research projects in this portfolio contribute to the continued exploration of textiles as a vehicle for communication, situating textile practice within a communication paradigm.

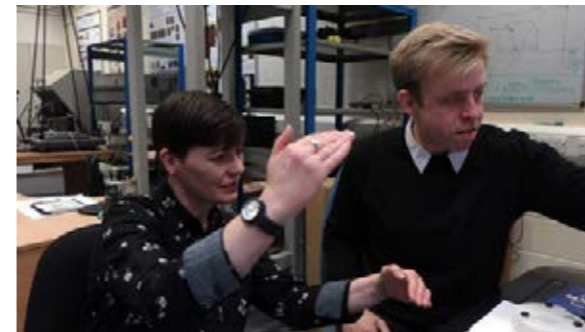
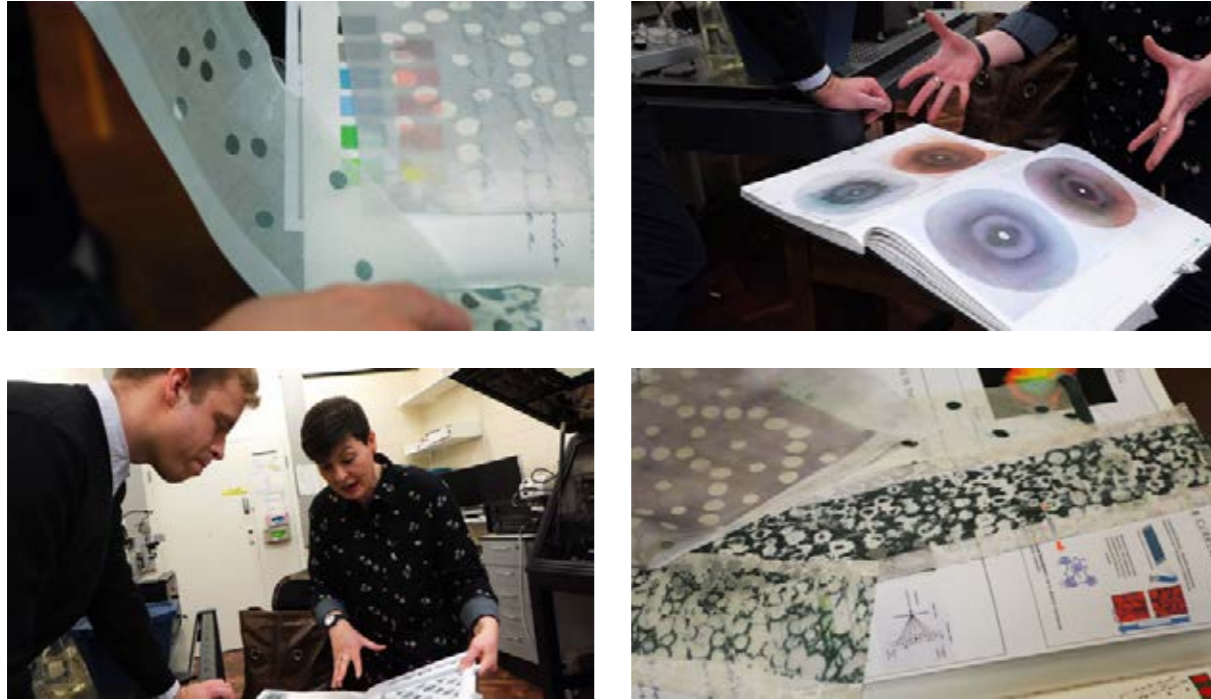


Figure 3: University of Leeds biophysics staff sharing insights into their research with Dr Sonja Andrew on one of the Creative Lab days. Photo credit: Stills taken from Paul Wyatt's filming of the Creative Labs.

Research Methods & Process



The Fabric of Research exhibition highlighted both the science and experience of cancer, juxtaposing artefacts based on personal narratives, with pieces designed to trigger dialogue on the discoveries made to improve cancer diagnosis and treatment. As the University of Manchester's lead designer on the project, Andrew worked as their project coordinator, creating textile artefacts for the exhibition, bringing in other designers at the university to develop additional works, and liaising with CRUK on logistics for the exhibition development, labs visits and meetings between the designers and CRUK researchers and patients.

To engage the public via a familiar product that could be displayed and handled, Andrew developed three 1x1 metre digitally printed silk scarves for the exhibition. 'Writing an End to Cancer' was specifically commissioned by CRUK as a symbol of their collective dedication to finding cures for cancer, incorporating the CRUK logo and staff signatures. 'We've Come A Long Way' incorporates historical images relating to medicine; from the medicinal use of plants and using sterilized horsehair and silk for suture, to the discovery of antiseptic sterilization, and the chemical structure for the breakthrough breast cancer drug Tamoxifen, informed by the work of CRUK Manchester researchers. Working with images provided by Dr Pedro Torres-Ayuso, 'Signalling Networks' depicts lung squamous cell carcinoma to highlight the use of biomarker testing and targeted precision therapies in cancer treatment. These designs were accompanied by text explaining the contemporary and/or historical research that informed each piece, with a link to enable viewers to engage in greater depth with the science on which they were based.

In January 2019 Andrew was selected as one of four funded practitioners to participate in the University of Leeds Cultural Institute's 'Creative Labs: Biological Sciences 2nd Edition'. This aimed to develop dialogue between arts and science, fostering 'a symbiotic creative relationship between the two fields' (Ladbury, J, 2019). The Creative Labs process incorporated a half day introduction on 14/1/19 where the practitioners and lead scientists met, three days in the labs with researchers from the biophysics team (scheduled between 15th January and 28th Feb 2019), and a concluding 'Sharing Event' on 4th March 2019. Andrew was

Figure 4: Andrew sharing her initial creative research and design responses based on the biophysicists' investigations and the work of William Astbury, with Dr Anders Aufderhorst Roberts, Research Associate, School of Physics and Astronomy University of Leeds.

Photo credit: Stills taken from Paul Wyatt's filming of the Creative Labs.

selected to collaborate with biophysicists led by Professor Lorna Dougan and Dr Anders Aufderhorst Roberts, exploring their work developing single molecule manipulation techniques and neutron diffraction to investigate the physics of living systems, with a focus on proteins (Figure 3).

During lab visits the importance of William Astbury 's historical work on fibrous proteins in the textiles field emerged. Andrew researched this further locating material in the University of Leeds International Textile Archive to build links, through the medium of textiles, between the contemporary work of the biophysics team and Astbury's breakthrough x-ray diffraction studies of silk and wool that revealed alpha-keratin protein fibres unfolding (https://www.leeds.ac.uk/heritage/Astbury/alpha_to_beta_transition/index.html), leading to the development of the field of molecular biology. The Creative Labs research project therefore focused on creatively exploring, through collaboration with the bio-physics team, the contemporary off-shoots of scientific exploration that stem from Astbury's early work, and may lead to another breakthrough scientific discovery. To communicate this, textile semantic methodologies were implemented, selecting imagery from x-ray diffraction studies and the bio-physics team's experiments, to develop initial creative responses via textile sampling and CAD (Figure 4). These were shared with the biophysics team to gain their responses to the encoded textile practice, and explore ideas on potential textile installations (Figure 5), public engagement, and outreach with schools based on the research.

Figure 5: One of three suggested textile outcomes presented by Andrew at the 'Creative Labs Sharing Event' at The Print Works, Leeds, 4th March 2019, to demonstrate how the initial creative explorations might be developed for the 'Astbury Conversation' international conference, March 2020, to engage audiences in aspects of historical developments in biophysics. The images within the suggested textile lengths shown are developed from William Astbury's x-ray diffraction research published in the 1930's, which includes stretching fibres such as silk and wool to begin to understand the behaviour of proteins at a molecular level.



Research Outcomes & Dissemination

'The Fabric of Research' exhibition was timed to coincide with the 'Biological Atelier' exhibition to maximize audiences for both ECOS events and was also disseminated via the CRUK and University of Manchester websites, newsletters and press releases, with articles on the exhibition in a range of regional newspapers and magazines. It included an evening private view and 'meet the designer' afternoon event, enabling the public to discuss the artefacts with the makers. The scarves were later exhibited by invitation at the 'Fashion as a Force for Good' evening event, University of Manchester, to further disseminate the research project to industry and the public. The scarves are scheduled for permanent display at the CRUK Institute, Manchester.

The textile concepts developed through the Creative Labs collaboration, were presented by Andrew at the 'Creative Labs Sharing Event', The Print Works, Leeds, 4th March 2019. Dr Anders Aufderhorst Roberts co-presented on the scientific research the bio-physics team were undertaking and the benefits of the arts/science dialogue in developing new perspectives on their research. This dissemination and networking event included Creative Labs arts and science participants (current and past), the Cultural Institute team, and invited guests from the arts and the University of Leeds.

The success of the 'Creative Labs' led to follow up meetings throughout 2019 to develop on the initial concepts generated from the collaborative process. This led to a successful EPSRC Public Engagement Engineering Champion funding for the project 'Exploring Creativity and Creative Thinking as an Effective Tool in STEM Public Engagement' public engagement grant, starting Sept 2020. Andrew is a participating artist in the research project, Phase 1: Development and evaluation of creative PE activities in hierarchical biomechanics, with £10,000-15,000 funding allocated within the grant to develop further creative practice and public engagement outcomes in collaboration with Professor Lorna Dougan's biophysics team. In June 2019, a further meeting was held with Professor Sheena Radford, Director of the Astbury Centre for Structural Molecular Biology (<https://www.astbury.leeds.ac.uk>), to discuss development of the textile samples and work in progress from the 'Creative Labs' collaboration for exhibition at the 'Astbury Conversation' International Conference at the University of Leeds in March 2022.

Group Exhibition:	2016	The Fabric of Research. Manchester Craft and Design Centre, 23-29th July, 2016, forming part of the European City of Science (ECOS) events. The exhibition included a 'meet the designer' afternoon public engagement event.
Conference Presentations:	2020	The Decoded Lab. British Society of Literature and Science Winter Symposium, University of Sheffield, 23-28th November 2020. *This is now an online event due to Covid-19 restrictions.
Media Coverage:	2016	The Fabric of Research. Regional newspaper and magazine articles, websites, newsletters. Articles on the exhibition were included in the following regional publications: The Lancashire Telegraph, Prestwich and Whitefield Guide; Bury Times, Wigan Observer, Bolton News, Chorley Citizen, The Westmorland Gazette, The Messenger, Lancaster and Morecambe citizen, and This is Lancashire. The exhibition was further disseminated via CRUK website/newsletter/press releases, and University of Manchester website/press releases.
Industry and Public Engagement Events:	2016	Fashion as a Force for Good featuring 'We've Come A Long Way', 'Signalling Networks' and 'Writing an End to Cancer'. Industry and public engagement evening event held by University of Manchester's Faculty of Humanities, and Business Engagement and Social Responsibility teams, at The Great Hall, Sackville Street Building, 12th October 2016.
	2019	Creative Labs Biological Science 2nd Edition Sharing Event: presentation, Q&A and handling exhibition of artworks/artefacts. The Print Works, Leeds, 4th March 2019. Overview of the Creative Labs Biological Sciences 2nd Edition, a film by Paul Wyatt, featuring Sonja Andrew's work: https://www.paulwyatt.co.uk/projects/leeds-creative-labs/ The film was presented at Hanoi University of Science and Technology and to the Head of the British Council, Vietnam, and at Hao Sen University, Vietnam, by Dr Stephen Dobson (Lecturer in Creativity and Enterprise at the University of Leeds).



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Artists create beauty from cancer stories

Exhibition aims to show progress of finding cure for cancer

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A cancer survivor has teamed up with fashion designers and scientists to create an intriguing exhibition with a difference.

Diane Griffiths, 66, an upholsterer, from Abram, has been working with **Cancer Research UK** and three designers to create garments for The Fabric of Research, a special exhibition in Manchester as part of European City of Science.

The exhibition, which opened last week, consists of beautiful scarves, dazzling textiles and weaving that tell a story aimed at bringing to life **Cancer Research UK's** work in the city.

Diane was diagnosed with breast cancer in 2014 and was treated with surgery and radiotherapy.

She has been working with fashion technologist Jayne Mechan from Manchester Metropolitan University alongside scientists and other women affected by breast or bowel cancer to produce a unique garment as a response to the biological, physical and emotional challenges of cancer.

Diane, who also volunteers at Race for Life, said: "I found it intriguing how the designers were able to interpret what I said about my experience, and then turn it into something tangible, bringing my experience to life for others to see."

"The finished pieces are a way of showing people the journey cancer patients go through, what they deal with and the advances in medical research and treatment that have been made."

"It has been a privilege to be part of such a unique project and hope my input has helped the designers to be able to make something creative and



It has been a privilege to be part of such a unique project

Diane Griffin helped create the exhibition

beautiful, out of what is the most terrifying diagnosis anyone can have."

Diane also helped Dr Sonja Andrew, senior lecturer in design at The University of Manchester, who has created three scarf designs each telling part of the cancer research story.

One incorporates images from medical history, from the days of using sterilized horsehair to stitch wounds, to the chemical structure for the breakthrough breast cancer drug tamoxifen.

Organisers hope the exhibition will celebrate pioneering progress in helping to beat cancer sooner and take science research to a different audience.

Sive Finlay, Research Engagement Manager at **Cancer Research UK Manchester Institute**, said: "We are bringing cancer research to life like never before - to celebrate the pioneering progress in helping to beat cancer sooner."

"We wanted to do something a bit different as part of European City of Science and explain some of the important research happening here in a new way."

The exhibition at Craft and Design in the Northern Quarter, opened to the public last week.

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Article Page 1 of 2

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Wigan Observer feature article, noting patient Diane Griffiths' partnerships in the CRUK project with Sonja Andrew and also with Jayne Mechan.



Signalling Networks

Dr Sonja Andrew, Senior Lecturer in Design, School of Materials, University of Manchester

Due to the complex nature of cancer, numerous and distinct mutations are present in every tumour. In DNA sequencing studies, analysis of signaling proteins with frequent mutations can be used to identify the molecular mechanisms that promote tumour formation.

This design is based on a research image of lung squamous cell carcinoma provided by Dr Pedro Torres-Ayuso, a PhD Postdoctoral Scientist in the Signalling Networks in Cancer Lab at the Cancer Research UK Manchester Institute. Lung squamous cell carcinoma (LSCC) is the most common lung cancer subtype in the UK, each year 500,000 new cases are diagnosed worldwide. In partnership with University College London, the CRUK Manchester Institute is a Lung Cancer Centre of Excellence. Our researchers are leading the way in developing new methods to detect and diagnose lung cancer earlier, monitor the disease non-invasively with biomarker testing and to control the disease using personalised therapy.

Targeted, precision therapies have been one of the greatest advances for cancer treatment in recent decades. As they are specifically directed against essential promoters of cancer, these therapies are generally more effective at halting the progression of the disease. As Dr Torres-Ayuso notes:

"The main objective of our research is to identify essential cell proliferation and survival promoters of LSCC with therapeutic possibilities. To this extent, we are interrogating common alterations from this type of tumour and establishing pre-clinical models to validate identified hits. Our results will shed light on the biology of LSCC and will allow discovery of new targets and more effective drug combinations to treat this disease."

Visit <http://www.cruk Lung Centre.org/> to learn more about Manchester's Lung Cancer Centre of Excellence

Example of text accompanying designs at the exhibition

References

Getzel, J. and Csikszentmihalyi, M. 1976. The Creative Vision: A Longitudinal Study of Problem Finding in Art. New York: John Wiley and Sons.

Kuhn, T. 1962. The Structure of Scientific Revolutions (1st ed.) Chicago: The University of Chicago Press (republished fourth Edition 2012).

Ladbury, J. 2019. Dean of Faculty of Biological Sciences, University of Leeds, quote from opening statement to introduce the Creative Labs process, 14th January 2019.

Schon, D. 2000. The Reflective Practitioner: How Practitioners Think in Action. Aldershot: Ashgate/ARENA.

Online:

University of Manchester press release featuring the scarves:
<http://www.manchester.ac.uk/discover/news/fabrics-inspired-by-cancer-research/>

'Fabric of Research' article in Manchester Cancer Research Centre newsletter:
<http://www.mrc.manchester.ac.uk/News?newsId=1204>
Fashion as a Force for Good: <https://www.manchester.ac.uk/collaborate/business-engagement/knowledge-exchange/case-studies/fashion/>

Overview of the Creative Labs Biological Sciences 2nd Edition, a film by Paul Wyatt, featuring Sonja Andrew's work:
<https://www.paulwyatt.co.uk/projects/leeds-creative-labs/>

Output Type:

Original artistic works, creative body of enquiry,
contribution to collaborative group exhibitions,
conference contribution