Hugo DALTON

Assimilated Watercolours

Pop up art exhibitions in Care Homes

May 2022

Dance, S. L., Dalton, H., Carolin, C., Clark, J., Ferrando Jorge, N., Hooker, H., and Mason, D.: Assimilated Watercolours: Pop up art exhibitions in Care Homes, EGU General Assembly 2022, Vienna, Austria, 23–27 May 2022, EGU22-11694,

https://meetingorganizer.copernicus.org/EGU22/EGU22-11694.html


G.A. Fripp
1848.

Introduction to the project

This project created a series of exhibitions that explore current research at the University of Reading’s Department of Meteorology through historical and contemporary works of art. Scientists at Reading are investigating the flood which occurred in Staines and Wraysbury in 2014. Their aim is to develop new ways to make weather forecasting more accurate by assimilating visual and mathematical data from sources including satellite imagery, aerial photographs and existing flooding maps.

Dalton has made a series of watercolour paintings of the research locations and the scientists at work. These have been merged with existing reproductions of historic artworks from the Royal Collection at nearby Windsor which also show views of the surrounding area. The idea is to show how different kinds of information are used to create a better understanding of the flooding. Reading University’s work helps governments and local agencies to combat the effects of climate change.

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Sections from a work by Queen Victoria, Queen of the United Kingdom (1819-1901)
On the Thames from the Home Park, dated 4 June 1865
Watercolour
Royal Collection Trust / © Her Majesty Queen Elizabeth II 2022

Objectives

The objective is to offer elderly people in care homes a connection to current science research in their local area. The project provides them with a link to places they may no longer be able to physically access. It allows residents to share their lived experience with others in each care home community.

The care homes are also visited by relatives and friends of the residents on a weekly basis. These visitors do not need to make a specific journey to see the exhibition and therefore incur no personal expenses or additional environmental impact.

The project team worked in partnership with selected staff members in each care home who visited the laboratory or artist studio to gain insight into the project and DARE. Their time and travel was funded through the project budget. The aim is to create advocates for the work of DARE who are trusted within their respective communities.

The artistic objective is to create an accessible visual identity for science and scientists and, simultaneously, to develop the medium of watercolour with specific reference to its own history. Watercolour rose to national popularity during the Industrial Revolution. Later it was used for the World War Two Recording Britain project to create a record of the UK's built and natural environment at a time when it was perceived to be at threat of wartime destruction.

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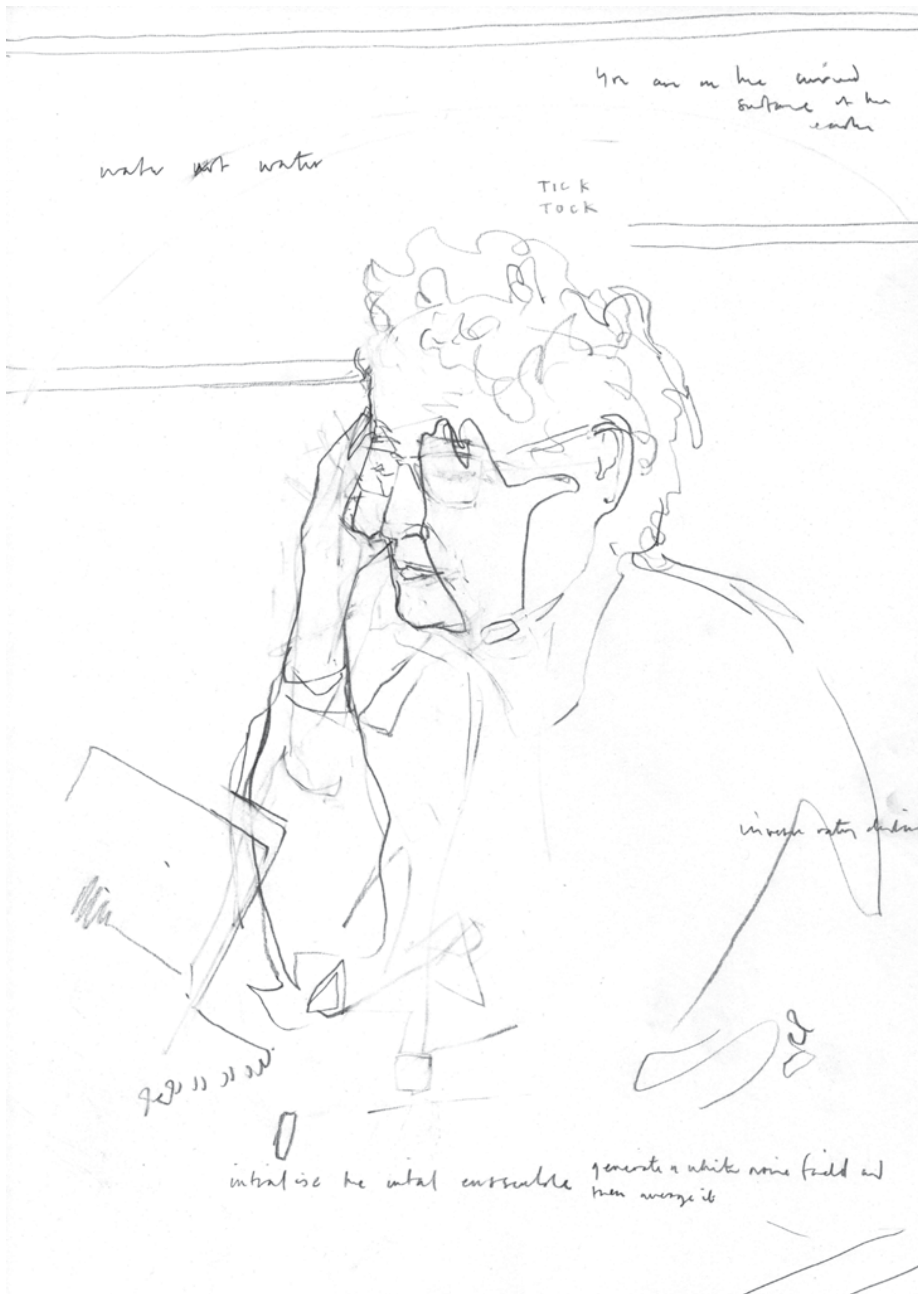

Sarah at work

Hugo Dalton, 2022

Introduction to DARE

Data Assimilation for the REsilient City (DARE) is a research project funded by Prof Sarah L Dance's UK EPSRC Senior Fellowship in Digital Technology for Living with Environmental Change at the University of Reading.

In a changing climate, urban areas are suffering from increased vulnerability to natural hazards, including extreme weather and flooding. Our ability to manage these hazards is limited, in large part, by the accuracy of computational model predictions that we use for long-term planning (e.g., designing flood defences) and the production of timely forecasts (e.g., guiding emergency responders).

Data assimilation is a sophisticated mathematical technique for improving predictions from large and complex computational forecasting models, by combining uncertain model predictions with a diverse set of observational data in a dynamic feedback loop. DARE has used advanced data assimilation to combine a range of advanced sensors with state-of-the-art computational models and to improve forecasts of urban natural hazards such as intense rainfall, floods, fog, snow, ice and heat stress.

We have worked together with government agencies and industry (such as the UK Met Office and JBA Consulting) to co-create some of our research, to help ensure that our findings are used in practice.

Sarah at work, Reading

Hugo Dalton, 2022

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Hugo Dalton
Early morning rowing boats on the Thames at Henley, 2022
Watercolour on Arches

Hugo Dalton said of this work: “I was watching them row into the morning mist…like scientists voyaging into an unknown space. The mist was emblematic of that uncertainly which science tries to make clear”.

About collaboration between Arts and Science

The DARE team has loved working with artist Hugo Dalton to illustrate and interpret our scientific work on satellite-derived flood observations through watercolours. Working with Hugo has challenged and inspired us as scientists, in explaining our ideas and in thinking creatively about the scientific process.

The pop-up exhibitions have opened new avenues for us to engage with the public about our work. In the past, we have delivered workshops for schools and for science fairs. These only reach certain sectors of the population, and presentations have a certain style that tends to be driven by generation of excitement and noise! Working with an artist has enabled us to reach different age-groups who live near our scientific study sites and who are affected by flooding. Our hope is that engaging these populations through art encourages reflection and discussion and perhaps a deeper consideration of the issues associated with hazardous weather in a changing climate.

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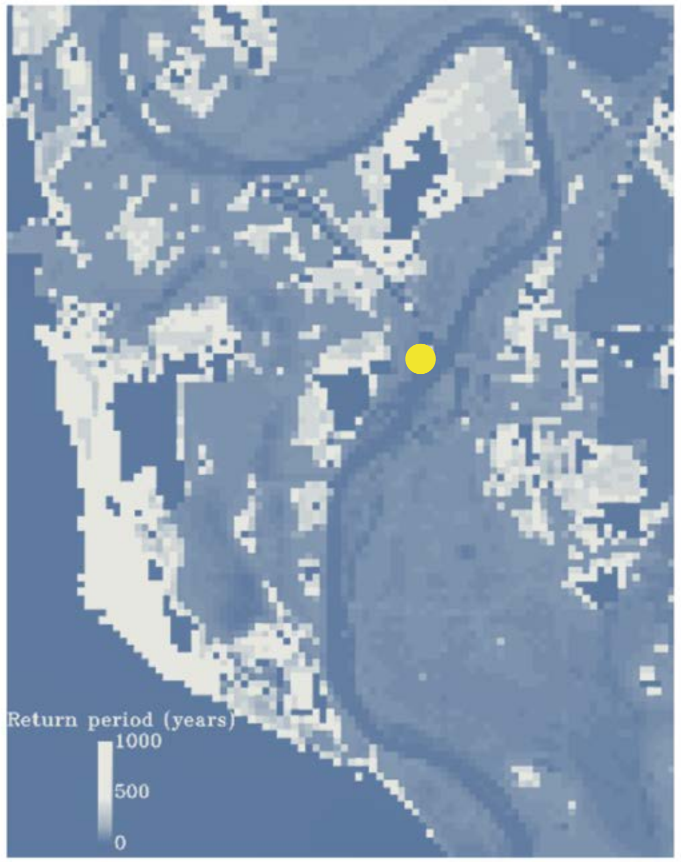

Flood Period Return Map

Courtesy of JBA Ltd. and University of Reading.
The yellow dot denotes the Old Lock Windsor

Hugo Dalton
Old Windsor Lock (After Peter de Wint), 2021
Watercolour on Bockingford

Despite the predictions of future flooding since the 2014 floods property prices along the Thames have been rising and new homes continue to be built in flood plains. The aesthetic pleasures of living beside water is held above scientific facts and risk.

This affinity to water is embodied in the continuing popularity of the English picturesque watercolour genre which dates from the late 18th century. The art form was used for topographical studies and then became more Romantic in reaction to the Industrial Revolution.

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ROYAL COLLECTION TRUST

Collaboration with Royal Collections Trust

The project's aim was to work with a collection held local and so Dalton approached Royal Collections Trust, Windsor. They allowed the reproduction and artistic reinterpretation of some of their works kept in the Print Room at Windsor Castle which related directly to the sites being studied by the team at Reading.

The Royal Collection contains one of the most important collections of drawings, watercolours and prints in the world. Most famous are the groups of around 85 portrait drawings by Hans Holbein the Younger and 550 drawings by Leonardo da Vinci, including studies of anatomy, landscape, water and natural history. From the Italian Renaissance there are also important groups by Raphael and Michelangelo.

Opposote page selected works from the RCT Collection (from top):

George Arthur Fripp (1813-96)
The Valley of the Thames from Hardwicke, 1848
Watercolour reproduction
Royal Collection Trust / © Her Majesty Queen Elizabeth II 2022

Anonymous (British School, 19th Century)
A View of Staines, Middlesex, undated
Royal Collection Trust / © Her Majesty Queen Elizabeth II 2022

Queen Victoria, Queen of the United Kingdom (1819-1901)
On the Thames from the Home Park, dated 4 June 1865
Watercolour
Royal Collection Trust / © Her Majesty Queen Elizabeth II 2022

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Hugo Dalton

Sarah at work, 2021

Ink on Paper

Combined with

George Arthur Fripp (1813-96)

The Valley of the Thames from Hardwicke, 1848

Watercolour reproduction

Royal Collection Trust / © Her Majesty Queen Elizabeth II 2022

A watercolour by George Arthur Fripp of the flooded Thames valley with Reading in the distance. Fripp was a pupil of James Baker Pyne who’s work can be seen in the booklet accompanying this exhibition. The historic work has been overlaid with a portrait by Hugo Dalton of Professor Sarah Dance, a world-leading researcher in data assimilation. Professor Dance has been awarded the Royal Meteorological Society’s Adrian Gill Prize for developing a mathematical technique of data assimilation, this is a transformational method of combining mathematics with weather prediction.

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Hugo Dalton
David, 2021
Ink on Paper

combined with

Anonymous (British School, 19th Century)
A View of Staines, Middlesex, undated
Royal Collection Trust / © Her Majesty Queen Elizabeth II 2022

Dr. David Mason, an environmental physicist at the University of Reading works on the automated extraction of information from satellite derived flood maps.

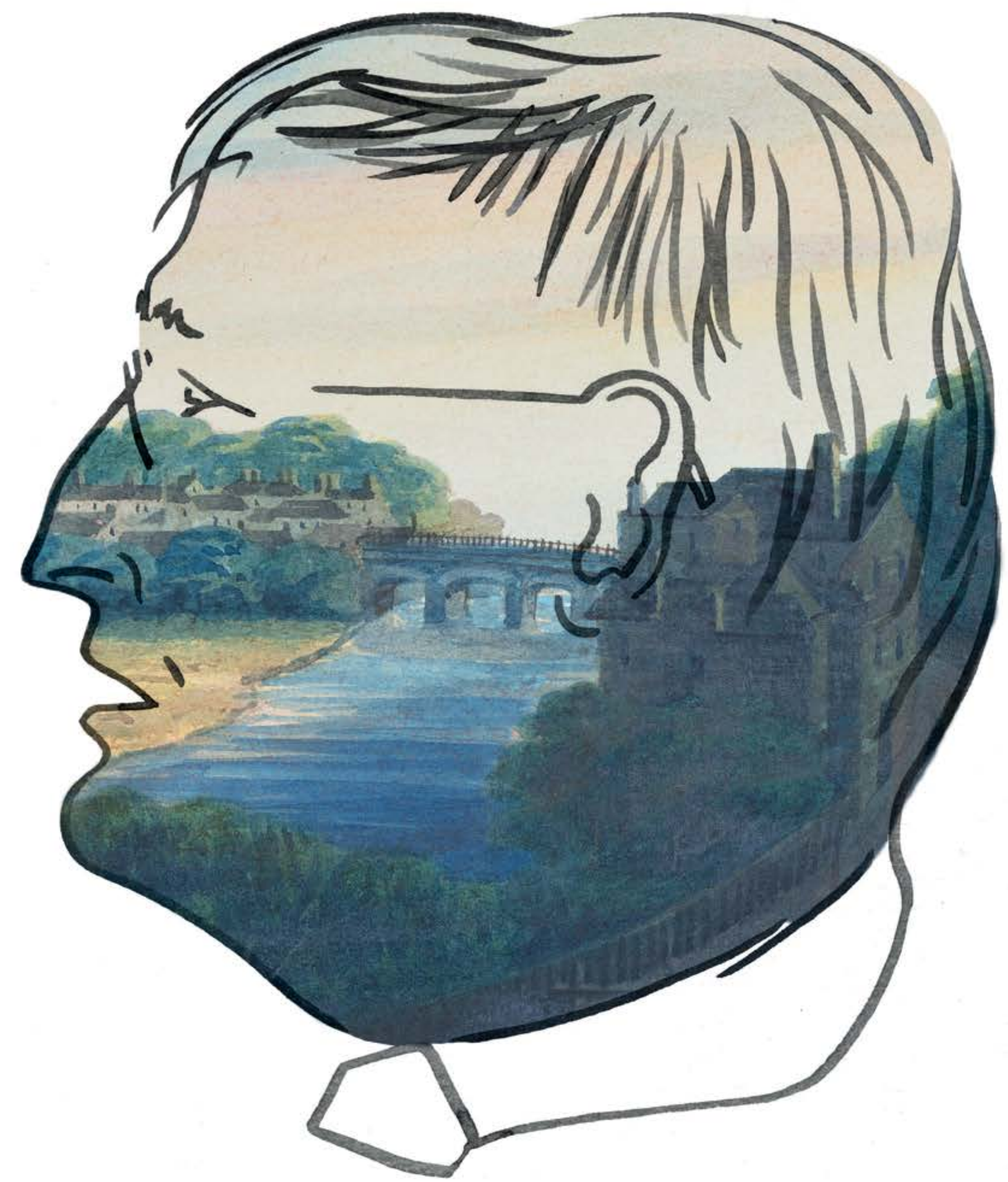

Fig. 1.

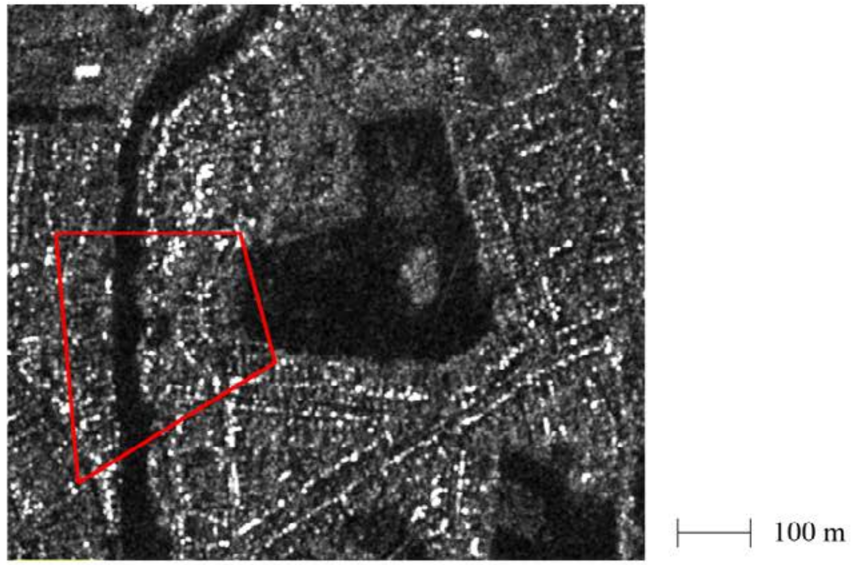

Fig. 2.

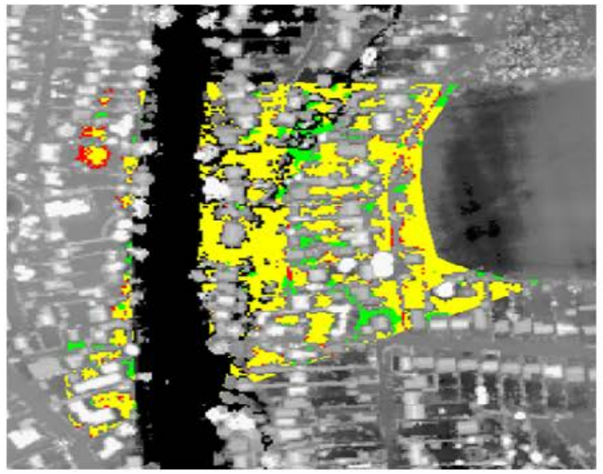
Fig. 3.

Improving urban flood forecasts

We are trying to improve the forecasting of river floods, and how they evolve over time, using computer-based models. In order to check that the model predictions are correct, we use observations of the flood extents from satellites. We often use Synthetic Aperture Radar (SAR) satellites, because these can see through the cloud that is generally present at time of flood, and also at night- as well as day-time.

Fig.1 is an aerial photo of the Thames flood at Wraysbury, West London on 14th February 2014 (© Getty Images). Fig. 2 is a SAR image of the flood, in which the dark areas are water. The red outline shows the area covered by the aerial photo in fig. 1.

Fig. 3 shows how well the SAR flood extent we have estimated matches the aerial photo flood extent, just in the urban areas (yellow = flooded in SAR and aerial photo, green = flooded in aerial photo only, red = flooded in SAR only). This is superimposed on the Environment Agency height map (lighter = higher) produced by airborne LiDAR. The flooding has been determined to 87% accuracy in this case. This observed flood extent can then be compared to the flood extent predicted by our model, to check how well the model predicts the flood.

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Riverside Close, Wraysbury 2014

Hugo Dalton, 2022

Aerial View Wraysbury 2014

Hugo Dalton, 2022

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Reflected Water below Albert Bridge, Windsor
Hugo Dalton, 2022

Working out which areas are flooded and which are not is key to understanding flood data. Light and reflections can play tricks on the eye as seen in the painting of Albert Bridge in Windsor. Similarly, data from satellites which scientists use can be confusing; when defining the extent of a flood the surface of a road might be mistaken for water. This can lead to inaccuracies which the team at Reading is trying to eliminate so that they can provide the emergency services with more precise information.

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“During recent research evaluating the Thames flood at Staines in 2014, we developed a scale-selective approach to compare and validate forecast flood maps with satellite data. This methodology was extended to the JBA international ensemble flood forecasting system and tested on the Brahmaputra flood in the Assam region of India in 2017. The historical watercolour of the Brahmaputra shows the vast extent of the river in contrast to the River Thames.”

Helen Hooker

View towards the Old Lock Windsor from Wraysbury Boat House,

Hugo Dalton, 2022

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Assam: alluvial deposits in the Brahmaputra, above Rakusni Hill

Hermann von Schlagintweit-Sakünlünski, 1826 - 1882

Courtesy of the Wellcome Library

This scene is of the Brahmaputra river in India. The mathematical model which Readings' scientists are developing for more accurate flood modelling is being tested there. The aim is that this will allow better planning in the future during flood events, which are on a vast scale.

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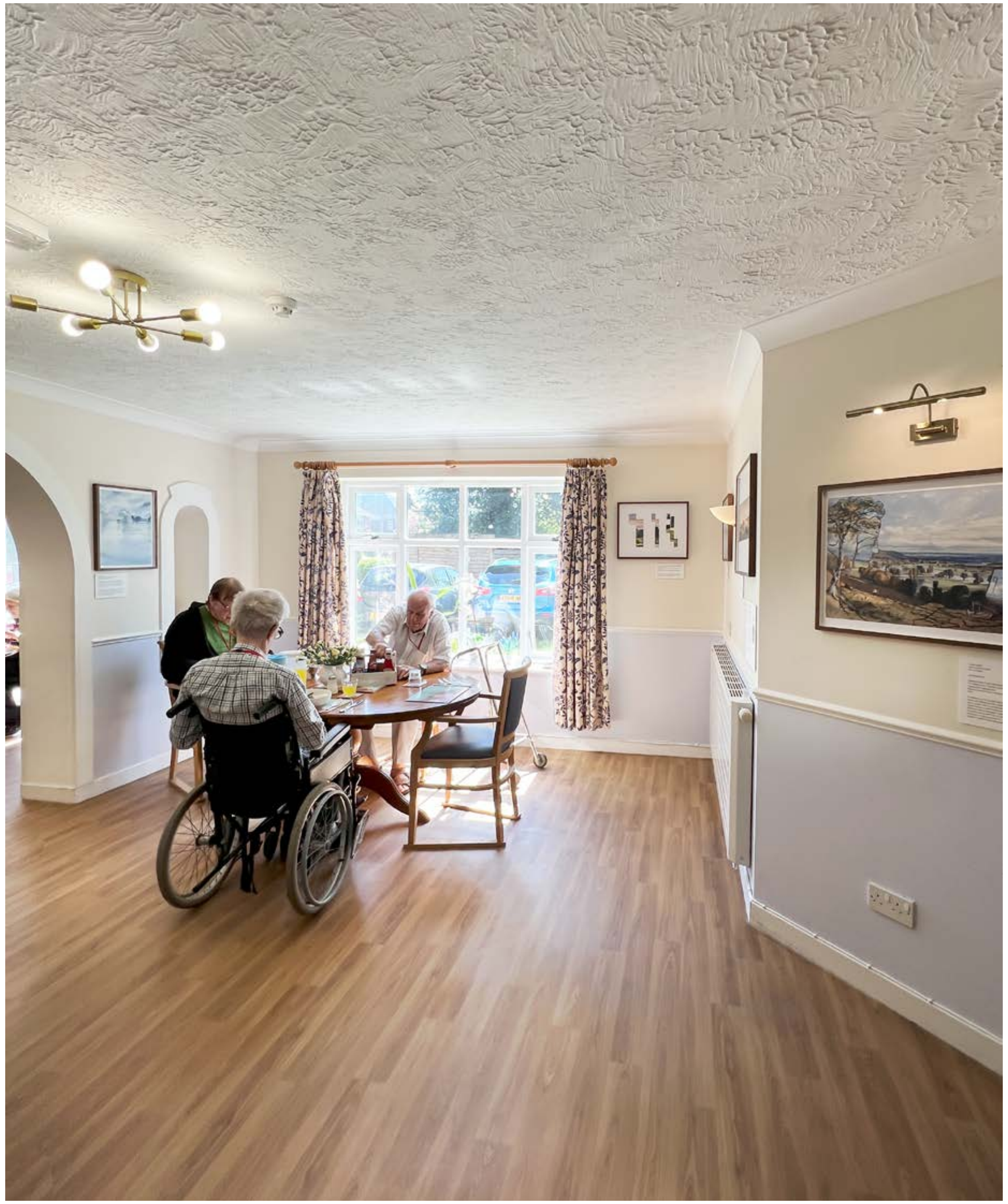
Moor House Care, Staines, London



Artwork installed at Moor House Care, Staines, London

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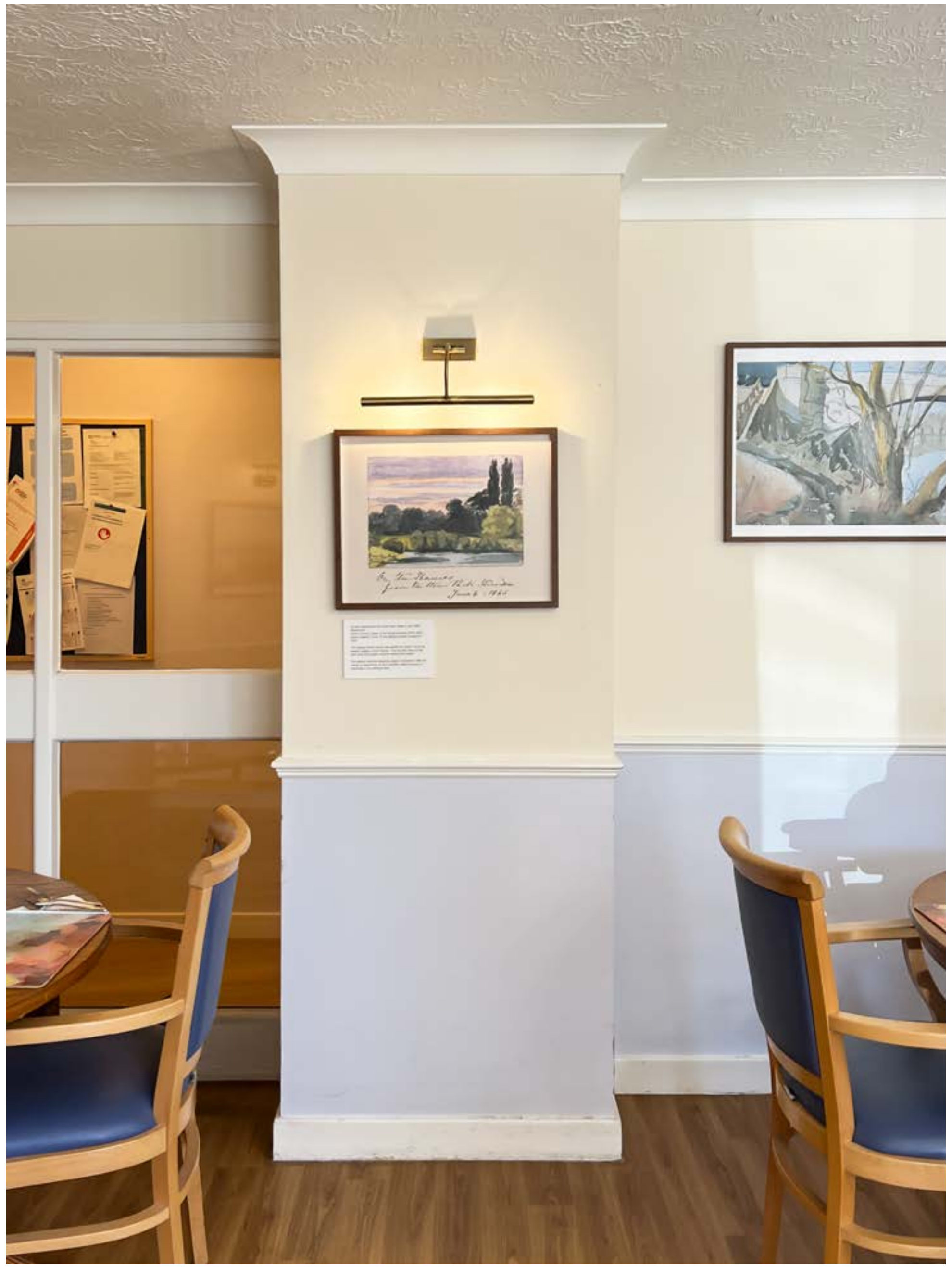

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Sarah Dance

Sarah L Dance is Professor of Data Assimilation, jointly held in the Departments of Meteorology and Mathematics & Statistics at the University of Reading. She is Divisional Director of Data Assimilation for the UK Natural Environment Research Council National Centre for Earth Observation (NERC NCEO) and holds an EPSRC Senior Fellowship in Digital Technology for Living with Environmental Change. Her research ranges from mathematical theory to practical applications for data assimilation in hazardous weather and flooding. In 2020, Professor Dance was awarded the Royal Meteorological Society's Adrian Gill Prize for her world-leading research in data assimilation, the mathematical technique for the fusion of observations with state-of-the-art computational models. Her work on the fundamental mathematical theory and novel methods for data assimilation for hazardous weather and flood prediction has been transformational in bringing together the disciplines of mathematics, numerical weather prediction and hydrology.

@DrSarahDance

http://www.met.rdg.ac.uk/~sws01sld/

David Mason

David is a Senior Research Fellow in the Department of Geography and Environmental Sciences, University of Reading. He has worked mainly on the development of improved methods of extracting information from remotely sensed data for environmental science applications, and of coupling these data to environmental models. He has developed methods for the automatic extraction of waterlines (instantaneous land-water boundaries) from SAR images in both riverine and coastal scenarios. These have been used in applications such as improving river flood inundation modelling and constructing height maps of beaches. Under the DARE project he has developed methods of detecting flooding in urban areas using SAR images, which should be of use for operational flood incident management and improved flood forecasting.

https://www.reading.ac.uk/ges/staff/david-mason

Helen Hooker

Helen is a PhD researcher at the University of Reading in the Department of Meteorology. Helen's research aims to improve the capability of real time 2D flood forecasts using data assimilation from earth observation or point data sources. A key aspect of data assimilation is comparison of computational forecast data with observations. However, the scales used in a computational model may be very different to those observed (for example, consider the comparison between an average over a large area with a measurement at a point). Therefore, it is important to first understand the spatial scales of variability in the forecast model to make a fair comparison.

Helen will study an ensemble forecast (where many forecasts are run, each with slightly different starting conditions) and develop methods to work out the scales at which we can reliably discriminate between forecasts. This is valuable for qualitative interpretation of forecasts for end users as well as for quantitative comparisons with observations. Ultimately, Helen will develop methods for comparing models with observations that take account of these scale differences, before building a full data assimilation system.This project is funded by the NERC SCENARIO DTP with support from JBA Trust.

Hugo Dalton

Hugo Dalton is a British artist working in London, his work stems from a commitment to drawing the natural world. Having studied at Goldsmiths College he painted a number of large scale murals for clients such as the Royal Horticultural Society, Tiffany & Co. and Liberty of London.

Each work has an educative narrative behind it and is a method to bring the public into a closer understanding with the subject. He has been collaborating with Rothamsted Research for five years, during which time he developed an exhibition to show-case their work at the Fitzwilliam Museum, Cambridge. He has been collaborating with Reading University's Professor Sarah Dance, recipient of the Royal Meteorological Society's Adrian Gill Prize for her world-leading research in data assimilation, the mathematical technique for the fusion of observations with state-of-the-art computational models.

Dalton's installations use his drawings to transform well known spaces such as the Today Museum Beijing, Victoria & Albert Museum and Sadler's Wells Theatre. He has been the recipient of Wallpaper magazine design award and created live drawing performances for the Royal Opera House, Covent Garden and Chateau Versailles, France.

www.hugodalton.com
@hugodaltonstudio

Nerea Ferrando Jorge

Nerea is a passionate environmental scientist and visual artist who has a special interest in bridging the communication gap that exists between science and the public with her research, environmental art, and through citizen engagement (https://www.nereaferrando.com).

Currently, she is a PhD researcher at the University of Reading in collaboration with the environmental NGO, Earthwatch Europe. Her research is part of “Climate-Proof Cities,” a EU project that aims to protect urban forest and soils in order to make cities more resilient to climate risks. It involves several universities and institutes, and enthusiastic citizen scientists from a global bank who are helping with key data collection.

Nerea is also involved in numerous science-art projects, including running the social media presence for AALERT 4DM network; working on art commissions for multiple scientific studies, and helping with the evaluation of a community outreach exhibition run by artist Hugo Dalton, and the University of Reading’s research network DARE.

Doctor Clare Carolin

Doctor Clare Carolin is a curator, writer, art historian, and researcher. Her work focuses on the intersection between art and various forms of state violence including neoliberal planning policy and its detrimental impact on communities and the built environment. Her current research addresses how the powerful instrumentalize visual culture and, conversely, how contemporary visual art can help to realize positive social change. She was Exhibitions Curator at the Hayward Gallery, Senior Curator at Modern Art Oxford and Deputy Head and Senior Research Tutor in the Curating Contemporary Art Department at the Royal College of Art. Recent exhibition projects include The Surface of the World: Architecture and the Moving Image at MCAD, Manila and The Age of Anti-Ageing at The Function Room, London and and Spectres of Modernism: Artists Against Overdevelopment at Bowater House and Raven Row, London (2017-18. She was the AHRC Collaborative Doctoral Award holder at the Imperial War Museum and the Ruskin School of Art (2015-2020). She is currently part of the curatorial team at the South London Gallery where she is co-editing a book about SLG’s award winning outreach programme, Open Plan. Her monograph, The Deployment of Art: The Imperial War Museums Artistic Records Committee will be published by Routledge in 2023.

FURTHER DETAILS

https://research.reading.ac.uk/dare/

Helen Hooker at EGU
https://meetingorganizer.copernicus.org/EGU22/EGU22-

David Mason at EGU
https://meetingorganizer.copernicus.org/EGU22/EGU22-

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