STRANGE WEATHER

FORECASTS FROM THE FUTURE

°SW

ISBN: 978-0-9926110-3-3

All rights reserved.

No part of this publication may be reproduced in any form by any electronic or mechanical means, including photocopy, recording or information storage without written consent from the publisher.

© Science Gallery
All work remains © of its respective author(s)

SCIENCE GALLERY

TRINITY COLLEGE DUBLIN

STRANGE WEATHER

FORECASTS FROM THE FUTURE

CONTENTS

Strange Weather

LYNN SCARFF & IAN BRUNSWICK

Why weather? It's been said, "Climate is what we expect. Weather is what we get." We are obsessed with the weather. It is a powerful, shared daily experience, offering us an immediate talking point with which to engage our fellow citizens.

We talk about the weather all the time, to both strangers and family, at formal settings or in the street. There isn't one central narrative about weather (unless complaining about the rain counts). Yet when we talk about the climate, there is a dominant narrative about impending destruction, costs, environmental degradation, droughts, floods, fires and carbon counts. It's enough to get you down.

One problem may be that many public dialogues about climate change evoke a sense of guilt or powerlessness. Campaigns warn of strange weather to come, urging virtuous individual action to prevent communal consequences. When developing STRANGE WEATHER we wanted to explore a different aspect of climate change. We wanted to effect a subtle shift, so that the discussion could become more interesting and incentivising, rather than daunting and paralysing.

STRANGE WEATHER engages you in a conversation rather than preaching at you. It involves work that propels you to consider your own relationship with changing weather and encourages thoughtful reflection as opposed to guilt or powerlessness.

Exhibits like *The Climate Bureau, Forecast from the Future, HazMat Suits for Children* and *SurvivaBall* invite the viewer to participate in speculation about the future climate, allowing us to imagine our own relationship with changing weather for better or worse. Other pieces such as *Talking About The Weather* and *Climate Council* pose questions and phrases in ways we don't usually use to talk about weather.

By engaging in weather and climate in a playful, provocative way, we hope to leapfrog over the current polarised debate. These exhibits contrast against projects like the Irish Centre for High-End Computing's *100 Year Climate Model of Earth* which starkly presents a variety of climate models based on predicted scenarios in the future—your potential children and grandchildren's climate playing out before you in a matter of seconds.

And then there is the personal. We often experience a personal connection to weather—the sunny day of a happy childhood memory, the cataclysmic snowstorm that meant someone couldn't make it home in time for Christmas. *Internet Poems about #Weather, Talking about the Weather* and *Archive of Old and New Events* dig in to how weather has shaped our past, present, and (perhaps) future—from how we speak to how we party.

Yet looking ahead can be tricky. Even when we can predict it, weather may wreak havoc or pleasantly surprise us. Our ability to accurately predict the weather in the short term has grown at roughly a day for every decade since the 1970s, meaning that at around eight days out, it's more or less a coin toss. *Weather Betting,* developed in partnership with Met Éireann, will measure the wisdom of the crowd versus professional forecasters at Met Éireann. Every Science Gallery exhibition is conceived with space for your contribution, and exhibits like *A People's Archive of Sinking and Melting*, *Archive of Old and New Events* and the *Climate Council* await your input.

Distinctly absent from most discussions of human-caused changes in weather is talk of who it will help—because after all, there will be winners and losers in climate change. One scary thing is that the 'winners' are suspiciously quiet at the moment. *Who Owns The Arctic* looks at a possible future of profiteering and corporate conspiracy of exploitation in the Arctic region. The exhibits, speculative fictions, and confounding propositions of STRANGE WEATHER can help us consider climate change and changing weather in a new light: who is going to take advantage of climate chaos and how will strange weather benefit me?

For STRANGE WEATHER, Science Gallery was hugely fortunate to work with lead curators CoClimate who, in collaboration with Gerald Fleming from Met Éireann, brought together a thoughtful, grown-up exhibition on a sometimes tricky and evocative theme. We are hugely grateful to them for their contribution, ideas and inspiration.

Equally, STRANGE WEATHER has brought together partners and supporters who have recognized the opportunities this unique theme brings to engage audiences in conversations about climate change. These include Science Foundation Ireland, Environmental Protection Agency and Sustainable Energy Authority Ireland. We would also like to thank the Faculty of Engineering, Mathematics and Science here in Trinity College Dublin who have partnered with us on the development of STRANGE WEATHER and connected many leading researchers in the university into the development of the exhibition, events and workshop programmes. Our partners provide invaluable support in terms of ideas, people and resources and we are hugely grateful for their support.

It's clear that weather is getting stranger, and if the time for debate isn't over, it's certainly time to frankly address what changing weather means and the tough choices we need to make. One temptation is to continue to debate and kick the can down the road, treating the changing global weather solely as an academic problem 'that needs further study' and reeling from one catastrophic strange weather event to another. This seems to do us a great injustice and forgets our ability to change, adapt and innovate—whatever strange weather brings it will certainly also bring with it new opportunities.

Forecasts from the Future

CATHRINE KRAMER & ZACKERY C. DENFELD,
Curators of STRANGE WEATHER and co-founders of CoClimate

BEING HUMAN

Humans look for patterns. Humans make meaning. We want to know what's going on. Being human means remembering the past and making forecasts about the future.

This exhibition is about what it means to be human on a changing planet with an uncertain future. When faced with uncertainty, humans make predictions, test models, and tell stories. By collecting some particularly striking forecasts about the weather and climate of planet Earth and our place on it, the STRANGE WEATHER exhibition reflects the dreams and desires, memories and models, needs and nightmares that we have about atmospheric patterns. *HazMat Suits for Children* and *Survivaball* are both humorous and horrifying—these are artworks that let us try on failed futures. The projects *Urpflanze* and *Climate Bureau* offer visions of the future, where scientists and policy makers succeed in shifting our priorities and actions towards desirable outcomes. The value of these forecasts from the future is not their predictive capability, but how they enable us to imagine and test out responses to possible scenarios—mapping what we expect, declaring our desires and acknowledging our fears.

WHY WEATHER?

Humans experience weather continuously via our senses. Our bodies take note of the slightest variations in temperature, light, wind and precipitation. The weather is everywhere and always on. When weather conditions are not extreme we may barely pay attention, only taking notice when weather changes dramatically. Terrifying storms power our nightmares. Reviving rains inspire joy and thanks. Sudden gusts of wind can change the way we walk. Even a warm sunny day can make us uneasy if it's the wrong time of year. Extreme weather drives human emotion and imagination.

The works in this show employ both scientific and artistic methods to investigate weather. *Raindrop* is a recreation of a 40-year old science lab apparatus that allows us to study a single drop of water that hovers in mid-air. *Thinking Like a Cloud* draws new connections between the microbes that live in clouds and on the human body. Other projects zoom out and draw our attention to environmental and political changes that are taking place in

the Arctic and in Europe. Our partners at Met Éireann have provided us with historical artefacts and helped us imagine what weather forecasting may look like in 2035. And the future is where things get strange.

STRANGE WEATHER

> Weather is driven by differences in temperature and moisture from one place to another. Climate is the average of these conditions over long periods of time. If weather is, by definition, difference, what makes weather strange?

Strange weather occurs when our lived experiences don't conform to our expectations or the models we have in our heads. Strange weather deviates from the patterns we have documented in the past. Strange weather differs from climate change because we experience it with our own senses, in real time. Climate change is only documented collectively, over the span of multiple human lifetimes, whereas strange weather is up close and personal.

When taking the long view, weather on Earth has always been strange, and the fact that the climate has remained relatively stable long enough for human civilisations to emerge is unusual. Scientists report that a future of strange weather is inevitable and is accelerated by current and past human activities. We will only know if strange weather is truly anomalous in the long run, but to borrow a phrase from economics, "In the long run, we are all dead". When anomalous weather events happen during our lifetime we respond by changing our habits, developing new behaviours, artefacts and ways of existing in the world. Stronger storms, massive floods and longer droughts drive us towards the creation of resilient cities, new festivals and novel agricultural practices.

Artworks such as *A People's Archive of Sinking and Melting* and *Archive of Old and New Events* document the relationship between a changing climate and human culture by collecting artefacts and imagining new celebrations for emerging environmental circumstances. Human culture is being reshaped to fit strange weather, but can we reshape weather to fit our strange culture?

WE HAVE ALWAYS BEEN GEOENGINEERS

Humans change things. We don't exist outside of nature. We are high on the food chain but, like everything else on planet Earth, we exist within the confines of the Earth's biosphere. Human individuals and civilisations consume energy and material. We often make a mess. Every year there are more of us, and our world energy consumption increases, but we are constrained by Earth's energy budget. Solar radiation comes in and infrared radiation goes out. Along the way novel technologies, from sedentary agriculture to fossil fuel use, have altered the way we change the planet. We have always been geoengineers, but we have not been very good at it.

Human cultures have a long and dubious history of trying to control weather events and the climate as a whole. This exhibition features *The Weather War*, which documents some of the more fantastical attempts at weather control from the last century, while *I Wish to Be Rain* asks if some humans might actually want their ashes to be used for cloud seeding after they die.

Human civilisation is reliant on complex systems that regulate the physical and biogeochemical flows on the planet. Anthropogenic activities have always had some effect on those processes. From the first human to the last, we will always shape the systems that shape us. Assuming that we want to continue the human project on planet Earth, what strategies can we implement to maintain a biosphere that humans can inhabit? On the long scale of human history, our use of fossil fuels will probably become a small part of the story. If we imagine restructuring and powering a civilisation without fossil fuels our attention turns again towards the sun. Towards differences in temperature, wind and precipitation. Ultimately, towards the weather.

A Forecaster's Perspective

Gerald Fleming,
Curator of STRANGE WEATHER and Head of Forecasting at Met Éireann

So much of what happens in our lives today is organised and predictable. Our journeys to work or school, our timetables of classes, meetings or deadlines. Even our weekend activities are timed, trimmed and scheduled. It seems that all facets of our lives are fully under control.

Not quite. The weather alone remains untamed, maintaining its ability to surprise us, disappoint us, even occasionally delight us with its disparate moods. It can strike fear to the heart, or provide balm to the soul. It is the last frontier of nature. The Atlantic Ocean is a theatre, where great meteorological dramas are played out every day; dramas in which we insignificant humans can play no part, except to look on in awe. At least in Ireland we have the best seats in the house.

Science has spent many centuries probing the mysteries of the atmosphere. From the Tower of the Winds in Athens to the supercomputers of today, humankind has struggled to comprehend the forces that are unleashed in the air around us. Not without success—today we understand the physics and dynamics that lie behind most of the common weather phenomena, and we use this understanding to try and predict the next moves the atmosphere will make. Weather forecasts have improved more in the past thirty years than in the previous three hundred.

Yet weather retains its capacity to surprise. Weather operates across a huge range of scales in both space and time, from the majestic low pressure regions that can cover half a continent to the tiny swirl caused by a leaf falling from a tree on an autumn evening. With our satellites, radars and observation stations we can capture information about the larger scales, but the smaller scales elude us; our knowledge of what the atmosphere is doing now, just at this moment, is unavoidably incomplete.

The people who work in Met Éireann, like those who work in all National Meteorological Services throughout the world, have accepted this unequal challenge; to pit our human wits against some of the most elusive expressions of nature, to understand the atmosphere both scientifically and viscerally, so that we may prepare the public for what lies ahead.

Like the weather itself, this preparation must span many time scales. Of course we want to know if it will be a fine evening, whether tomorrow will be dry, or whether the rains will come to sustain the crops in our fields. However, we also need to know in what ways our atmosphere is changing; in what ways we insignificant humans have finally managed to affect the air around us. What does that mean for the climate that will sustain our children, and our children's children, through the middle and later years of the 21st century? For all of our regulated and insulated lives, understanding and appreciating weather and climate has never been more important for humankind than it is today.

Modelling

Models are simplified reflections of reality. They help us test ideas, theories or patterns we believe we have observed in the world. Models are constrained and they never perfectly or exactly capture reality. Models are a form of compression. We make models to clarify as well as imagine. They help us focus on what we believe are the essential drivers or elements of the phenomena we are interested in.

In this exhibition we include social as well as scientific models. Some models have been chosen for their predictive or explanatory capabilities. Other models fail to reflect reality, but in their divergence from the world as it actually is, they open up the imagination to entirely new possibilities and realities.

100 Year Climate Model of Earth

Irish Centre for High-End Computing (IE)

2014

This interactive 3D exhibit draws on the EC-Earth climate model to put the predictions of climate modellers at visitors' fingertips. Members of the Irish Centre for High-End Computing (ICHEC) have selected particularly interesting results showing what the climate of planet Earth may look like in the next hundred years. Visitors can choose to see simulated predictions such as rising temperatures and decreasing sea ice, choosing between futures where humankind continues to emit large amounts of greenhouse gas or works towards decreasing its rate of emissions.

The EC-Earth model consists of an atmosphere-land surface model coupled with an ocean and sea ice model. Met Éireann, ICHEC and University College Dublin were the three Irish institutions involved in both the development of the model and the running of simulations on the ICHEC supercomputers. The results contributed towards the recent Intergovernmental Panel on Climate Change (IPCC) AR5 report.

Bio: The Irish Centre for High-End Computing (ICHEC), founded in 2005, is Ireland's national high performance computer centre. Its mission is to provide high-performance computing resources, support, education and training for researchers in third-level institutions.

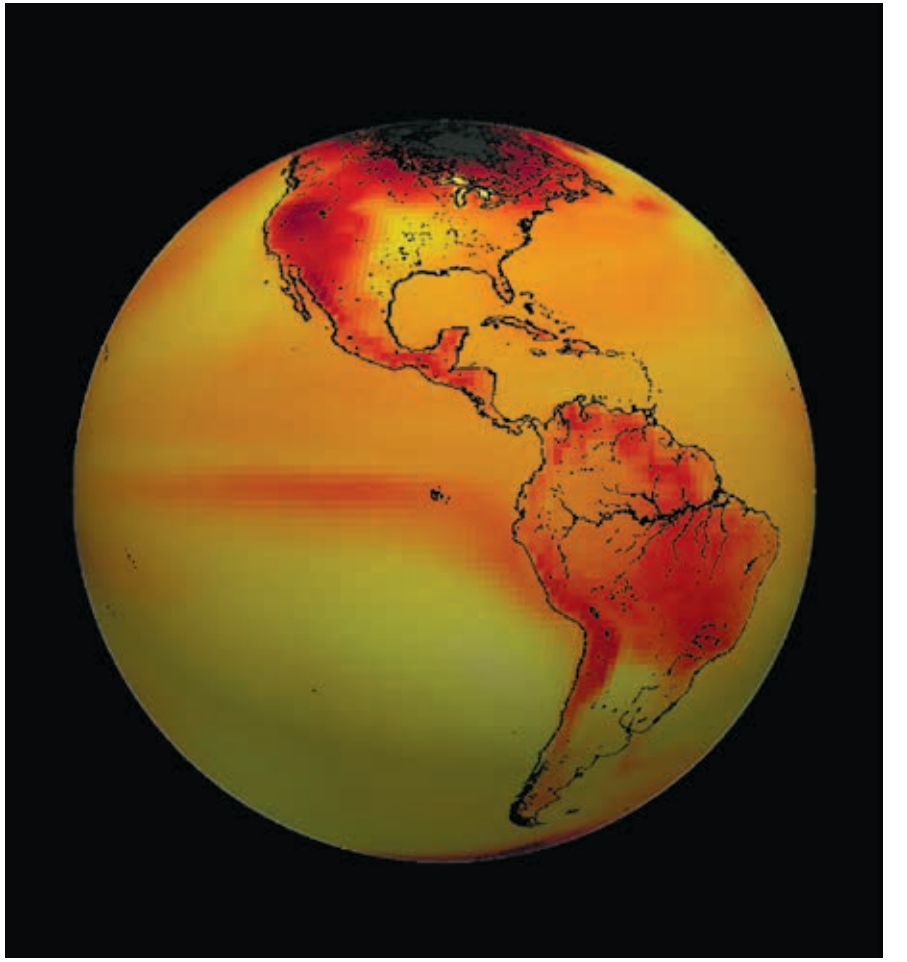


Image: ICHEC

Forecasts from the Future

CoClimate (US & NO)

2014

What will weather forecasts and the weather news look like in the future? What kinds of new meteorological phenomena and weather-derived events will need to be covered by news outlets?

In this installation visitors enter a green screen TV-studio and choose one of many weather news scripts to read. Topics include Ireland's 2050 weather forecast derived from today's best climate models, the political fallout from unilateral implementation of geoengineering technologies, the economic and weather forecast from rapidly changing regions such as the Arctic, and a meteorological tongue twister that catalogues all of the vernacular sayings for describing rain in Ireland.

CoClimate invited artists and scientists in STRANGE WEATHER to produce scripts about various future scenarios. *Forecasts from the Future* includes contributions from ICHEC, FICTILIS, Jodi Newcombe, Tega Brain, Owen Wells and Gerald Fleming.

Bio: CoClimate is an artist-led think tank that aims to explore and understand climate change from many perspectives. CoClimate looks at the history of human attitudes towards weather and climate, and considers future scenarios. From the scientific to the social, what can we expect in the coming decades?

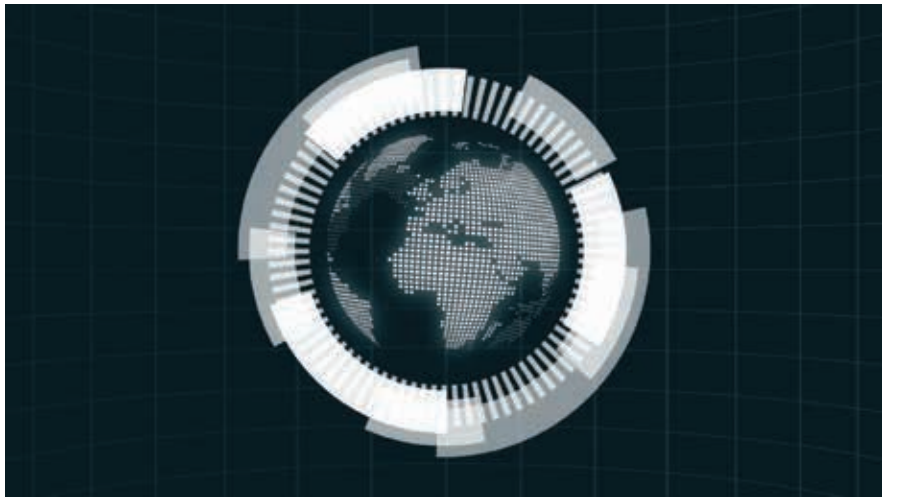


Image: CoClimate

HazMat Suits for Children

Marina Zurkow (US)

2012

Dupont's patented Tychem® hazardous materials clean-up suits are used in petroleum industry disaster response to mitigate ecological disasters. These suits have been re-scaled to outfit them for children. The suits are sealed to prevent humans from entering them, thus assuring that no children are harmed in the process.

HazMat Suits for Children is one part of the Necocracy series, based on research in the Permian Basin, which includes video animation, drawing and sculpture—a meditation on geology, time, nature and petrochemical production. Questioning the inherited, Romantic-era division between the natural and the human, the works navigate between human manufacturing of petroleum-based products, ecology, and the geological chronology of oil.

In the Permian Period, 250 million years ago, the geological riches of the area were formed, as marine microorganisms accumulated in sediments on the floor of a vast saline sea. Over millions of years, the seas dried out, the landmass itself moved to its present location, and the marine creatures transmuted into hydrocarbons. In the past century, we have pumped over 100 billion barrels of oil and a hundred trillion cubic feet of gas from the Texas hydrocarbon reservoirs. The exhibit asks us to think about how we disturb, worship and are dominated by these long-dead beings: necrocracy, or the rule of the dead.

Bio: Marina Zurkow is a media artist focused on near-impossible nature and culture intersections, such as invasive species and petrochemical interdependencies.

o-matic.com/play/necrocracy/hazmat.html @zurkow

Image: John Berens

Isobar Drawings

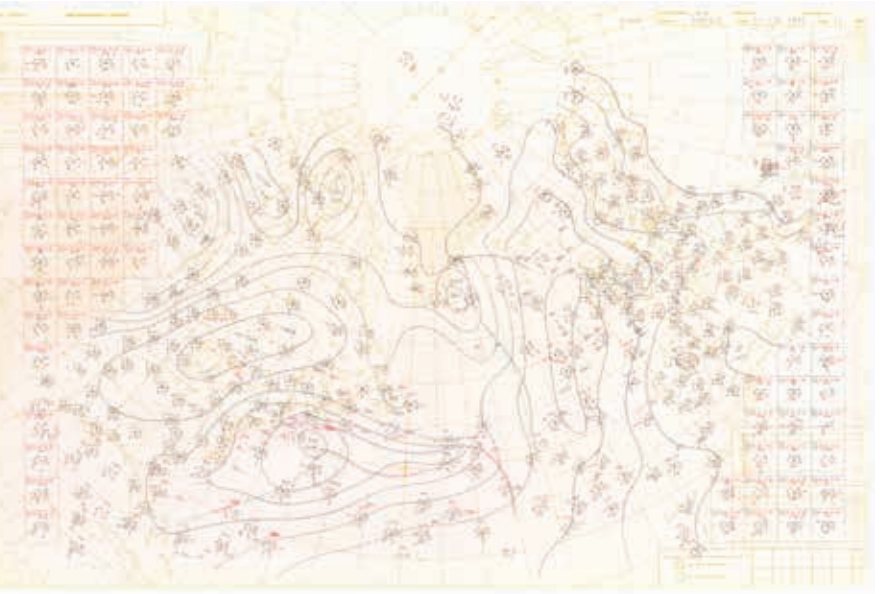
Met Éireann

1944
1961
1990

Isobar maps are used by forecasters to analyse the current state of the atmosphere as a precursor to predicting future weather patterns. The display isobars, which are lines connecting points of equal atmospheric pressure, usually drawn at intervals of 4 millibars (5 millibars is more usual in continental Europe). Weather fronts are then added to indicate the bands of cloud and rain. Meteorologists at Met Éireann still hand-draw isobar maps because the kind of interpretation of data that is required is more accurately and efficiently performed by humans than by computers.

This exhibit contains reproductions of isobar drawings from the archives of the Met Éireann library, from three historicaly significant dates: 3–6th June 1944 (the decision to postpone D-Day), 15th September 1961 (Hurricane Debbie) and 11th June 1990 (Italia '90).

Bio: Met Éireann, the Irish National Meteorological Service, is a line division of the Department of the Environment, Community and Local Government. It is the leading provider of weather information and related services for Ireland.



Drawing: Met Éireann

Weather Betting

Met Éireann & Science Gallery (IE)

2014

The ability of meteorologists to make long term forecasts about the weather incrementally improves by about one day every decade. In the 1970s, meteorologists could reliably predict three days into the future. In 2014, weather predictions are reliable for about seven days. However, eight days into the future, things start to get hazy. Met Éireann generally only publishes detailed forecast for five days in advance, although it can usually give a more general idea of the likely weather for a further two or three days.

A precise forecast—say the temperature at a given place and time for tomorrow week is, however, at the limits of forecastability.

Weather Betting explores the limits of forecasting by pitting the visitor against Met Éireann and the weather prediction computer models, forecasting what the temperature will be at noon, tomorrow week, at Dublin Airport. Guesses from Science Gallery visitors will be averaged and compared to predictions by professional meteorologists at Met Éireann.

At the limits of computation and measurement, who will be more accurate: the forecasters or the wisdom of crowds?

Bio: Met Éireann, the Irish National Meteorological Service, is a line division of the Department of the Environment, Community and Local Government. It is the leading provider of weather information and related services for Ireland.

Image: William Murphy (CC BY-SA 2.0)

Documenting

Documenting is a process of taking notice, collecting evidence, making meaning and leaving a record for others to interpret. Documenting strange weather poses a significant challenge. Weather consists of difference: flows and events which can disappear and melt away as quickly as they appear. What kind of physical evidence can be collected about rain, wind and heat waves? What are the physical artefacts resulting from a blizzard, tornado or lightning strike?

Strange weather leaves behind memories, new language, changed habitats and occasionally damaged human artefacts. The works in this section are collections of particularly ephemeral evidence that await your interpretation. What do they say about our planet, humankind and the strange moment we find ourselves in?

Climate Council

CoClimate, (US & NO)

2014

The *Climate Council* is a focus group for the future. Whereas most public opinion polls provide choices and talking points that confirm what we already suspect, the *Climate Council* is intended to ask questions and generate debates about unexpected and undesirable futures.

There is a psychological mismatch between the sober, rational questions that are asked in opinion polls, and the radical and discontinuous futures that are popularly associated with runaway climate change and environmental devastation.

The *Climate Council* presents provocative and uncomfortable questions in order to recast the debates around climate change. It also invites participants to contribute questions they want answered, allowing the discussion to evolve and change throughout the duration of the exhibition and reflect the concerns of the public.

Bio: CoClimate is an artist-led think tank that aims to explore and understand climate change from many perspectives. CoClimate looks at the history of human attitudes towards weather and climate, and considers future scenarios. From the scientific to the social, what can we expect in the coming decades?

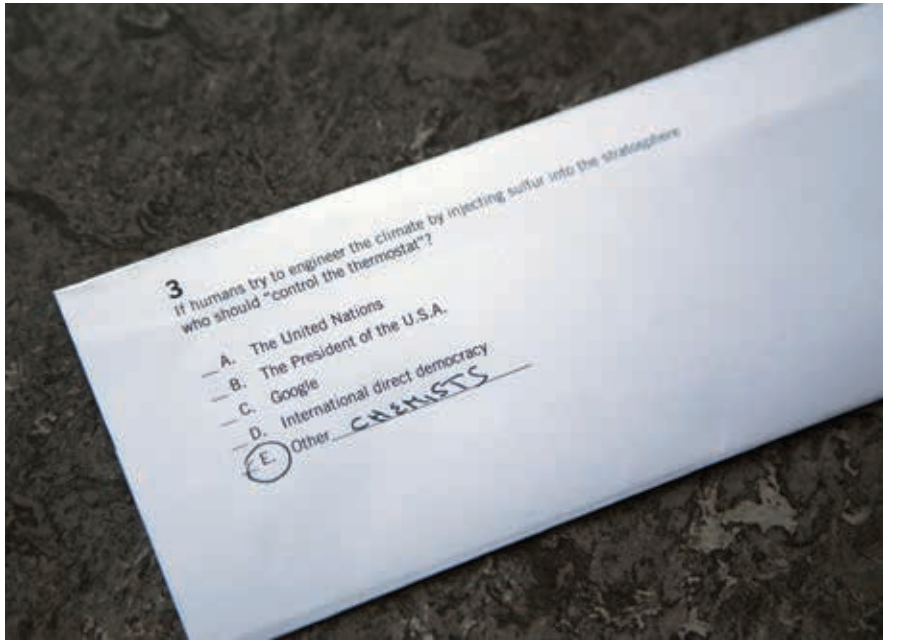


Image: Ruža Leko

Cloud

Matt Kenyon (US)

2013

Cloud is a multimedia art installation that provides a visual, interactive critique of the US sub-prime mortgage crisis and the housing bubble originating in 2007. The viewers witness common house-ownership dreams disappear as fast as they materializes — just as many saw the false promises of their homes disappear as they were quickly foreclosed upon during this period.

Miniature artificial house-shaped clouds are created 'on the fly' in order to critique the global fallout that resulted from the bursting of the US housing bubble. Local housing capacity to consumption ratios determine the size and frequency of cloud generation, creating a stream of house-shaped clouds.

This work functions at the convergence of two scientific systems, which are deeply rooted in prediction and classification: economics and metrology. The vernacular discussion of the weather contrasts with the opaque and technical dialogue surrounding the global economic crisis. This project uses the viewer's vernacular understanding of weather, clouds and participation to tell the stories resulting from the recent global financial crisis.

Bio: Matt Kenyon is an artist and educator who focuses on critical themes addressing the effects of global corporate operations, mass media and communication, military-industrial complexes, and general meditations on the liminal area between life and artificial life.

Image: Corine Vermeulen, courtesy of Museum of Contemporary Art Detroit

Internet Poems About #Weather

Lauren Thorson (US)

2013

We have fully integrated digital media into our lives. Daily interactions are not only defined by, but shaped and inspired through connections via the internet. Checking social media outlets has become as much of a morning ritual as drinking coffee, brushing your teeth, or checking the weather forecast.

Internet Poems About #Weather is a collection of writing compiled by searching the hashtag #weather on the social media platform Tumblr. The blog posts sourced are re-defined as 'internet poems' through an archive and curation process performed by the artist, similar to a literary review. This larger collection forms a publication that catalogues humans and their everyday relationship to weather as broadcast through social media, and investigates connections between the verbal and digital social constructs weather provides in a conversation.

Within this post-digital environment, the publication encompasses not only a graphic representation of language, but also examines human interaction techniques and developments of applied perceptions of identity through technology—specifically how hypermediacy, remediation, and immediacy affect communication.

Bio: Lauren Thorson is fifty-percent of the design studio Studio Set, and currently a Designer-In-Residence and Visiting Faculty at Virginia Commonwealth University. Her work ranges from traditional graphic design to more experimental visualisation systems.

laurenthorson.com @lauren_thorson
studio-set.com

Image: Lauren Thorson

Occupy II

Tania Kitchell (CA)

2012

Occupy II is a representation of alien and invasive plant species that have been sighted in Arctic regions. When it comes to the geographic distribution of plant species, scientific studies show that the Arctic remains primarily unscathed. However, there are a small number of species whose origins derive from elsewhere and have spread to Arctic regions due to human activities. These are referred to as ‘alien species’.

In *Occupy II* the plants are made of ABS plastic that have been formed with 3D modelling software and formed on a 3D printer. Photos were used as references to reproduce plant forms; there is an intentional disregard for a precise likeness as sizes and proportions are not adhered to, but there is a strong connection to the existing plants.

Does this disconnect between perception and reality in any way parallel our misconceptions about the Arctic?

Bio: Tania Kitchell is a Canadian visual artist born in Saskatchewan who lives and works in Toronto. Her multidisciplinary art practice engages in an ongoing exploration of our relationship with nature and our perceptions of it.

Image: Tania Kitchell

A People's Archive of Sinking and Melting

Amy Balkin (US)

2013

A People's Archive of Sinking and Melting is a growing collection of items contributed from places that may disappear due to the combined physical, political, and economic impacts of climate change, including glacial melting, sea level rise, coastal erosion and desertification. Through common but differentiated collections, the contributed materials form an archive of the future anterior; what will have been.

The materials in the archive mark the asymmetry of present or anticipated loss, standing in as proxies for the contributors' recognition of the geopolitical production (or spatial politics) of precarity and slow-onset dispossession. Together, the contributions form one material record among many; a collection of community-gathered evidence, a public record, a midden.

The archive operates from the principle that anything is equally valuable as a record of present or projected future disappearance of a place, as chosen by someone there. A contribution doesn't have to originate from that location—it can be anything that happens to be there, including detritus, flotsam or jetsam.

Bio: Amy Balkin is an artist whose work involves land and the geopolitical relationships that frame it. Her projects address legal borders and systems, environmental justice, and the allocation of common-pool resources.

Image: Mary Lou Saxon

Talking About the Weather

FICTILIS (US)

2014

Talking About the Weather is a series of works created from FICTILIS's research into weather-related language, specifically the technical terminology used in climatological and meteorological science, and the colloquial expressions used to describe weather attributes by English-speakers around the world. Examples drawn from these lexicons are combined with new coinages, based on existing phrases, to produce a linguistic preview of possible weather phenomena and human response, which shows how language can both reflect and affect our current concerns about global climate.

'Climate change' is as much a question of linguistics as it is a question of climatological, meteorological, and atmospheric sciences. Witness the way the term 'climate change' itself has gradually replaced 'global warming' in the popular media, the recent rise of the concept 'Anthropocene', and the brief celebrity status of the 'Polar Vortex'.

The project's pairing of 'low' and 'high' language, of informal folk expressions motivated by subjective experiences of weather, with phrases sourced from official scientific dictionaries which ostensibly refer to real, measurable things, highlights the difficulties faced by anyone attempting not only to accurately measure weather patterns that have no real historical precedent, but also to label them in a way that is both clear and accurate. There's no accounting for tastes, as they say, and no accounting for strange weather.

And yet, just as talking about the weather actually serves a vital social function, so might our talking about climate change become something that serves to bring people around the world into a common conversation and single purpose.

Bio: FICTILIS is the collaborative practice of media artist Andrea Steves and writer and artist Timothy Furstnau. They produce multimedia projects, exhibitions, and events, often in collaboration with other artists and institutions. They aim to foster new ways for cultural productions to reach diverse audiences, and seek to promote work that is aesthetically, conceptually, socially, and technologically engaging.

Image: FICTILIS

Understanding

What is rain? How is the Arctic region changing? How does space weather affect us here on Earth? The works in this section seek to understand the physical properties, processes and patterns of weather and climate. Additionally, the works take into account human activities and desires as one aspect of understanding the natural world. This is unusual in the natural sciences.

Historically, understanding nature required erasing the contributions and traces of human activity. This collection of tools, maps and experiments explicitly include the human animal in the web of biogeochemical and physical interactions that comprise the patterns on our planet. Taken as a whole, these pieces help us understand that humankind both affects and is affected by the planetary processes we call weather and climate.

The Atmosphere: A Guide

Amy Balkin (US)

2013

The Atmosphere: A Guide is a poster-essay visualising the ways in which human beings occupy the present, the past and the future atmospheres, and the accumulated traces of these activities. The guide has drawn on the format of the Cloud Code Chart, a chart created to aid in the interpretation of cloud reports from the International Figure Code published in 1949, which provides a basic introduction for the identification of clouds. *The Atmosphere: A Guide* is organised by layers of the atmosphere from sea level to the exosphere.

Which atmosphere is it? The biogeochemical or the geopolitical? A global commons or militarised space? Does the difficulty of human occupation of the atmosphere produce a space for projection and speculation? A space of indeterminacy? *The Atmosphere: A Guide* charts some atmospheric politics and their downward influences.

Bio: Amy Balkin is an artist whose work involves land and the geopolitical relationships that frame it. Her projects address legal borders and systems, environmental justice, and the allocation of common-pool resources.

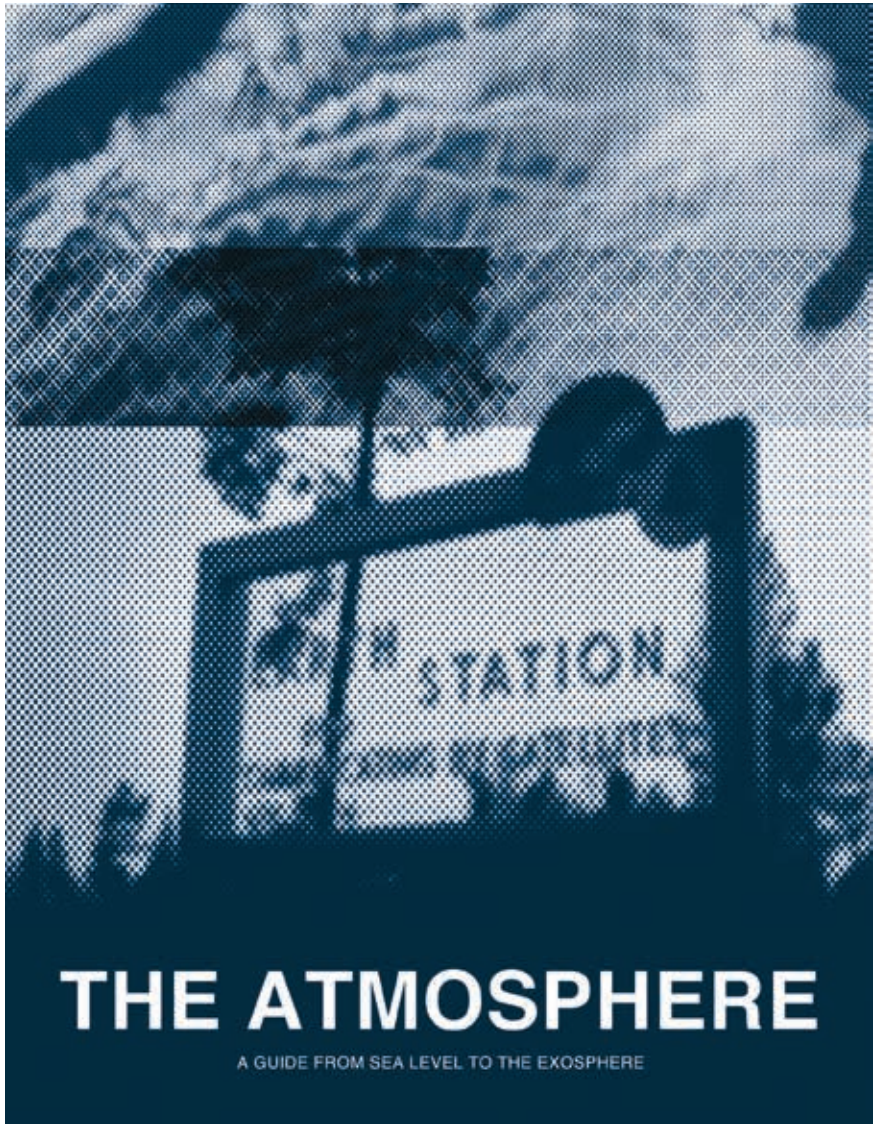


Image: NASA, Jeff Schmaltz and Whitney Combs

Raindrop

Alistair McClymont (UK)

2013

Raindrop is a machine built to allow a drop of water to hover in mid air, based on an experiment at the University of Manchester in the early 1970s performed by physicists C.P.R. Saunders and B.S. Wong. After the artist saw the original machine at Manchester University's meteorology department, he contacted Clive Saunders and was sent a copy of their original paper. The machine was built based on a sketch of this original machine with the permission of Clive Saunders.

In a sense a continuation of this original experiment, the machine is now being presented as an artwork and the context has changed to a different kind of institution. The experimenter is now a member of Science Gallery staff rather than a scientist, and the public observes the experiment instead of instruments recording the results.

The machine allows a single drop of water to free fall in an open wind tunnel. The viewer is watching a drop remain almost stationary, and yet, from its perspective it is constantly falling at terminal velocity.

The work allows visitors to closely observe something simultaneously extraordinary and everyday. If the drop is in free fall and the viewer is next to it watching it fall, then perhaps the viewer is falling alongside it. The combination of wind tunnel physics being something familiar but behaving in a way not observed before is beautiful but catches the viewer off guard.

Bio: Alistair McClymont produces work that is a continuing process of discovery and experimentation, ranging across a variety of materials and practices. Each piece follows the last in a continual journey of investigation into cultural and physical phenomena. Recent work is underlined by a search for what it is to be human.

Image: Alistair McClymont

Solar Wind Aeroscope

Jonas Hansen
and Lasse Scherffig (GE)

2014

The *Solar Wind Aeroscope* is an artistic instrument dealing with atmospheric conditions that depend on 'space weather' a storm of electromagnetic particles from the sun that constantly affects our atmosphere. It uses an Internet connection (in the gallery) or a radio receiver (in the wild) to measure radio signal range. This is accomplished through a global network of amateur HAM-radio stations known as WSPRnet. The signals from this network stem from places all over the world and often travel for thousands of kilometers. This is only possible because space weather causes an ionised layer at the border between earth and space, known as ionosphere. Radio waves may repeatedly bounce off the ionosphere and thus reach places they normally couldn't reach—depending on how well they are reflected. Because the ionosphere and its reflectivity change with the solar wind, the activity of the WSPRnet echoes space weather conditions.

By looking at radio signals and where they come from, the *Solar Wind Aeroscope* thus can 'see' the current atmospheric conditions caused by the solar wind. To make these measurements accessible to us as well, the *Solar Wind Aeroscope* translates the solar wind into actual wind—transforming the gallery into a terrestrial weather station for extraterrestrial weather.

Bio: Jonas Hansen is a designer and artist teaching at the Academy of Media Arts in Cologne. He works with experimental interfaces and games that investigate the borders between the virtual and the real world.

Lasse Scherffig is an artist and scientist working on experimental computer science and cybernetics.

Image: Jonas Hansen

Thinking Like a Cloud

Karolina Sobecka (US & PO)

2013

The Cloud Collector is a device for *Thinking Like a Cloud*. It is sent into the atmosphere attached to a weather balloon. Clouds condense on its mesh wings and flow into a sample container. These cloud samples are analysed for microorganisms and ingested by experimental volunteers. By combining the cloud microbiome with their own, the volunteers become part cloud and keep a cloud journal reporting their transformation. *Thinking Like a Cloud* is a scheme to expand human consciousness and enable systems thinking.

The objective of *Thinking Like a Cloud* was developed after Aldo Leopold's land ethics motto 'thinking like a mountain'. It describes an ability to appreciate the interconnectedness of things over space and time. The clouds have long served myth-makers, philosophers and scientists, as the face and the boundary markers of the forces shaping our world. Today their ephemerality and complexity embodies the essence of dynamic interconnected systems. In *Thinking Like a Cloud*, clouds are ingested by humans.

Bio: Karolina Sobecka is an artist, designer and director. Her artwork often engages public space and explores the way we interact with the world we create and imagine. Her recent projects focus on climate engineering as a way of investigating the values that drive technological innovation, and shape the philosophy that inscribes humans in nature.

Image: Karolina Sobecka

Tidal III

Rosie O'Reilly (IE)

2013

Irish sea levels will rise by half a metre by the end of the century, flooding and coastal storm surges will become the norm, and Dublin will face new challenges as the high tide leaves its mark on our cultural, natural and human systems.

Tidal III is a visual response to rising tides. Taking inspiration from the moment when the ocean reaches its high tide point, *Tidal III* explores that unseen line that now represents our vulnerability in the face of rising sea levels and climate change. The print and marks used in this piece draw from *4/704*, an audio-visual installation by the artist on Sandymount Strand for Dublin Fringe Festival in 2013.

There are on average 704 high tides a year—*4/704* was an installation that physically marked the high tide. Four self-contained dying units were built on Sandymount Strand to record the point of high tide. The piece was a multi-sensory experience for the audience, combining natural tide systems, materials, sound and texture. These elements were experienced by the public at midnight on a full moon high tide as they walked along the Sandymount promenade.

In STRANGE WEATHER, fabric that serves as a temporary shelter will be processed by the artist to represent the high tide in the gallery.

Bio: Rosie O'Reilly is an aritst, designer, and Creative Director of Re-dress, an organisation set up to develop an awareness of the detrimental environmental and humanitarian impact of the fashion industry in Ireland and abroad. She is also the designer of art and fashion house 'We Are Islanders'.

re-dress.ie
weareislanders.com

Image: Des Moriarty

Adapting

Weather is something we react to everyday, in the clothes we wear, the transport we take and food we eat. If it suddenly begins to rain we get an umbrella or seek shelter. Strange weather makes us act strangely. We don't expect to wake up to a city underwater or live through a drought that lasts decades. We find ourselves in novel situations, lacking familiar tools or habits that we can employ successfully without thinking too deeply.

When anomalous events happen more frequently, we have to change our ways —developing new behaviours, artefacts and ways of existing in the world. Sustained strange weather requires planned change or adaptation.

The exhibits in this section prototype new ways of being, focusing particularly on the new psychologies and societies we can imagine for ourselves in the face of significant disruptions and changes.

Archive of Old and New Events

Jodi Newcombe & Tega Brain (AU)

2014

Humans are quite literally 'party animals'. Festivals and gatherings define a culture and show a universal appetite for revelry and celebration. Many are historically linked to seasonal cycles and local climate conditions. With the onset of strange weather and dramatic shifts in contemporary climate, many of these long-standing festivals could languish as their environmental triggers change or die off. The last half of the twenty-first century could be replaced with strange new cultural phenomena.

Archive of Old and New Events explores these historic festivals and festivities of the future. This speculative project imagines an archive, established in 2030, with a mission for collecting and preserving artefacts from these events. On show are two collections; *The Collection of Lost Festivals* holds materials from events no longer in existence—an assortment of fragile artefacts from celebrations gone quiet. The other is *The Collection of New Festivals* which documents recent cultural phenomena that have emerged in response to new weather and climate. Both explore the consequences of strange weather, materialising cultural loss and the extraordinary human capacity for adaptation and celebration.

For more information or to contribute information about an old or new seasonal festival, please visit the *Archive of Old and New Events* website.

Bio: Tega Brain is an artist and engineer whose work rethinks the infrastructures, interfaces and institutions that structure our relationship with larger environment systems. She creates site-specific installations, dysfunctional devices, experimental infrastructures, speculative services and information visualisations.

Jodi Newcombe is a curator and creative producer specialising in artistic responses to environmental challenges. Jodi is Director of Carbon Arts, an organisation working to facilitate an increased role for artists in generating awareness and action on climate change.

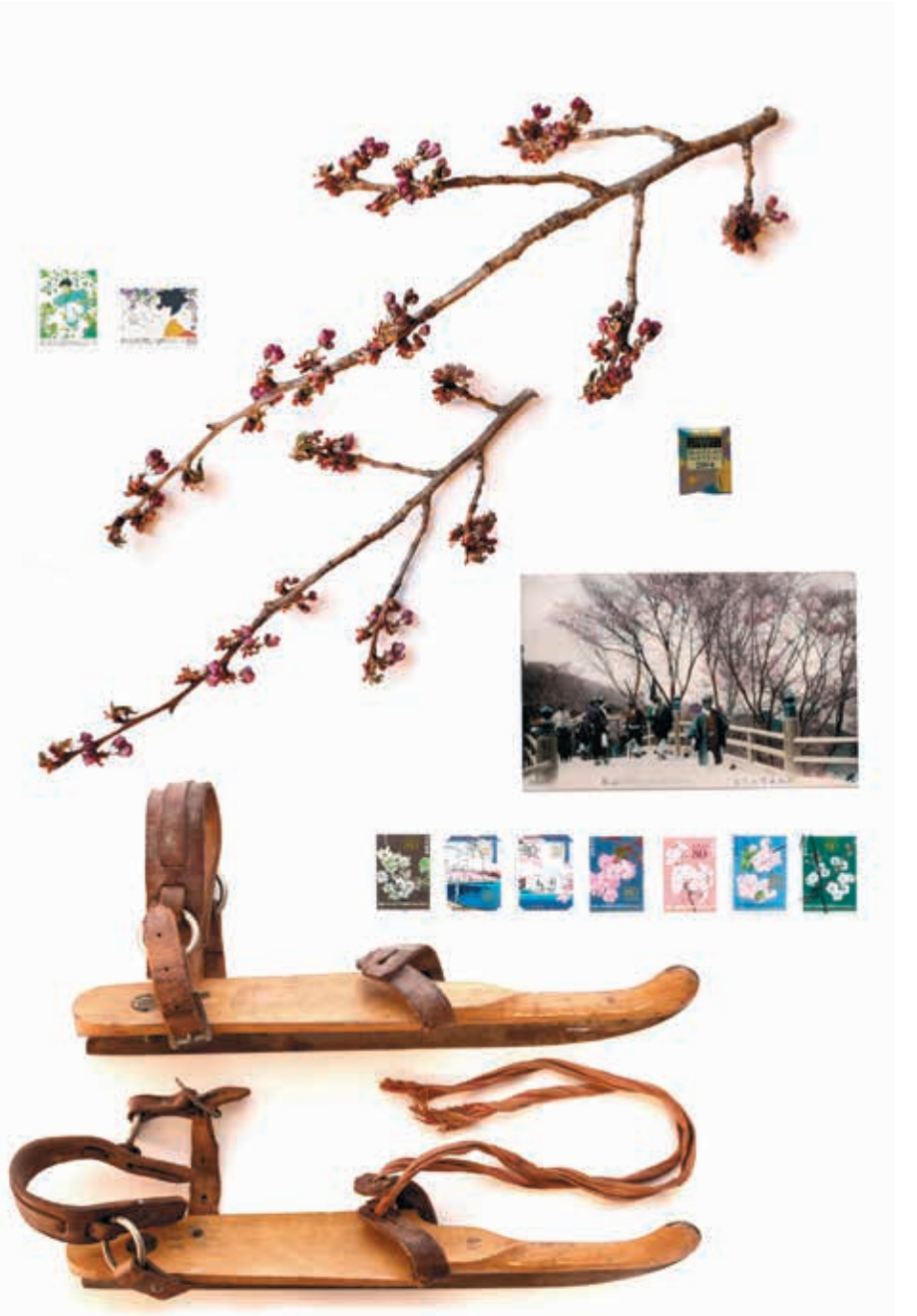


Image: Tega Brain

Climate Bureau

CoClimate (US & NO)

2014

If you've ever made a prediction, especially about your own future, you know how hard it can be. For most people, describing their preferred outcomes in relation to unknown futures is like learning to speak a new language, wrestling with unimagined scenarios. In this artwork, we provide a set of introductory scenarios and questions about the future that reveal to you how easy it is to make the transition from regurgitating dominant future narratives to scenario planning, where a world of potential profit and adventure awaits.

Where do you want to be in the future? If you were given the choice between excitement or comfort which would you choose? Imagined as a hybrid between a travel agency and a career counselling centre, the *Climate Bureau* provides personalised consultations preparing you for a future with weather that is warmer, wetter and weirder. Entrepreneurial types might be interested in exploiting the new trade routes and business opportunities that are emerging with an opened Arctic Northwest Passage. The socially concerned may want to pick up a new language in order to communicate with the climate refugees that will likely head towards the relatively safe shores of Ireland. Choose one of our package deals today, and begin the journey towards a brighter tomorrow.

Bio: CoClimate is an artist-led think tank that aims to explore and understand climate change from many perspectives. CoClimate looks at the history of human attitudes towards weather and climate, and considers future scenarios. From the scientific to the social, what can we expect in the coming decades?

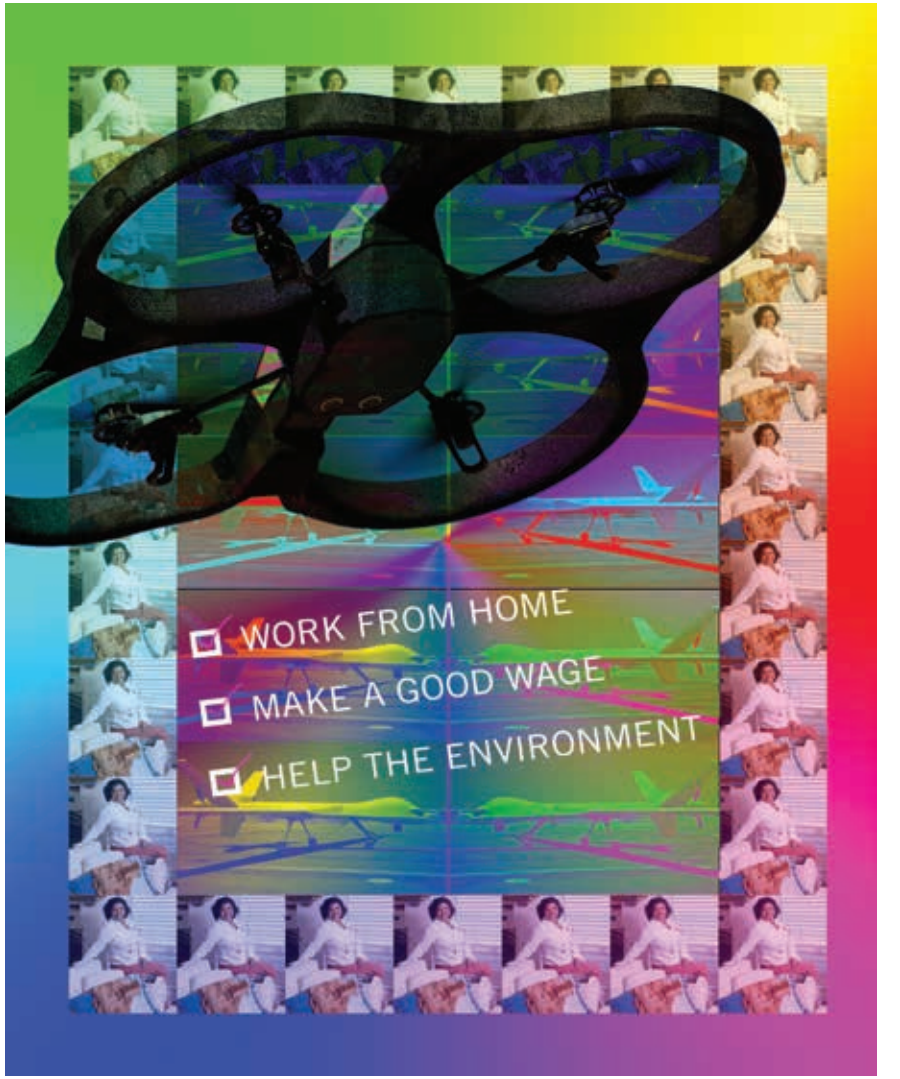


Image: CoClimate

Dear Climate

Marina Zurkow (US), Oliver Kellhammer (CA), Una Chaudhuri (US) & Fritz Ertl (US)

2014

When you make acquaintance with something, you invite it into your mental world. Then it's only a matter of time before you get to know it better. The imagination gets seriously involved now, the conversation deepens, the plot thickens. Being hospitable—truly hospitable—involves opening oneself to the unknown, and the gifts of the guest can change the host profoundly. Becoming follows. Becoming disturbs the existing set-up, crosses 'clear' boundaries, confuses convenient categories. Becoming is about mixing, spilling, leaking, seeping, suffusing, pervading. It's about telling strange tales, making nonsense, weathering the weather, claiming the climate, and taking the temperature of our times.

Dear Climate responds to the psychic dimensions of climate change and global 'weirding'. It is a training program for the spirit and the imagination, using a tone, aesthetic and vocabulary that avoid crisis and catastrophe. *Dear Climate* animates the familiar and ordinary; instead of desperation and heroism, it fosters playfulness and friendliness. *Dear Climate* is after a conceptual nudge rather than a paradigm shift. Its media are images, written and spoken texts, and sound. Its venues are home screens and walls, streets, and galleries. Its form is open-ended: more to come.

Bio: Four people make up the team responsible for Dear Climate: Marina Zurkow, a media artist focused on near-impossible nature and culture intersections; Oliver Kellhammer, a Canadian land artist, permaculture teacher, activist and writer; Una Chaudhuri, Professor of English, Drama, and Environmental Studies at New York University; and producer and director Fritz Ertl, who teaches theatre at NYU's Tisch School of the Arts.

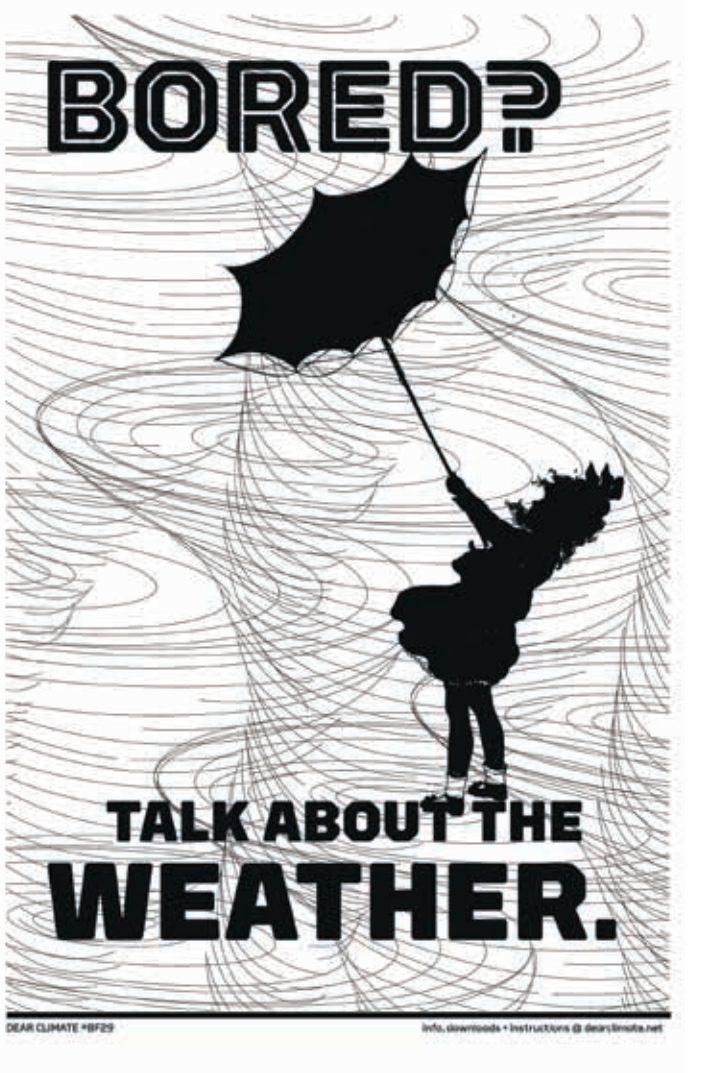


Image: Dear Climate

o-matic.com/dearclimate @zurkow

SurvivaBall

The Yes Men (US)

2006

An advanced technology that will keep corporate managers safe even when climate change makes life as we know it impossible. "The *SurvivaBall* is designed to protect the corporate manager no matter what Mother Nature throws his or her way," said Fred Wolf, a Halliburton representative. "This technology is the only rational response to abrupt climate change."

Wolf and a colleague demonstrated three *SurvivaBall* mockups at the Catastrophic Loss conference held at the Ritz-Carlton hotel on Amelia Island, Florida, in 2006, and described how the units will sustainably protect managers from natural or cultural disturbances of any intensity or duration. The devices include sophisticated communication systems, nutrient gathering capacities, on-board medical facilities, and a daunting defense infrastructure to ensure that the corporate mission will not go unfulfilled even when most human life is rendered impossible by catastrophes or the consequent epidemics and armed conflicts.

"It's essentially a gated community for one," said Wolf. "It builds on Halliburton's reputation as a disaster and conflict industry innovator. Just as the Black Plague led to the Renaissance and the Great Deluge gave Noah a monopoly of the animals, tomorrow's catastrophes could well lead to good—and industry must be ready to seize that good."

Bio: The Yes Men are a group who use any means necessary to agree their way into the fortified compounds of commerce, and then smuggle out the stories of their undercover escapades to provide a public glimpse at the behind-the-scenes world of big business.

Image: The Yes Men

Who Owns the Arctic

Owen Wells (UK)

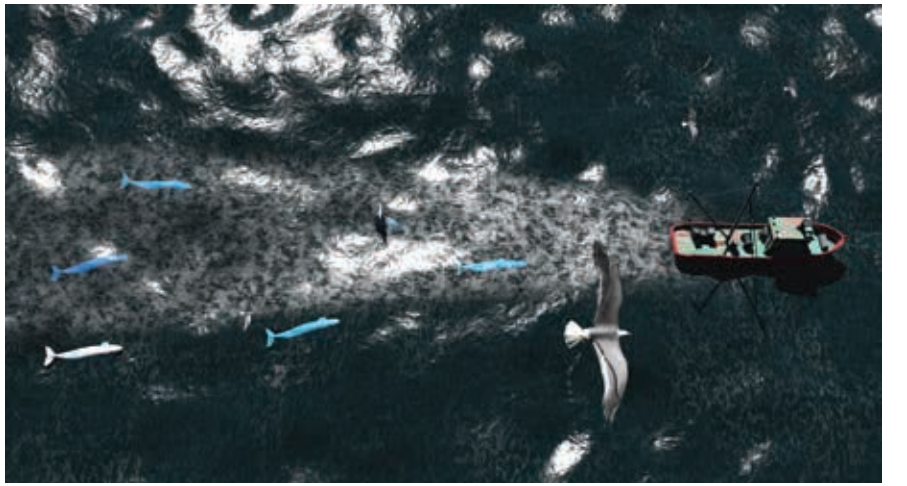
2013

The Arctic is home to the world's largest untapped gas reserves: 13% of the world's remaining oil, and vast mineral deposits. These commodities, compounded by the effects of climate change, have opened up the Arctic to corporate profiteering and the potential geopolitical tension caused by unresolved sovereignty claims.

Who Owns The Arctic is a series of texts, images, maps and pieces of bespoke equipment that present speculative conspiracy stories, created to identify and expose political and corporate profiteering in the Arctic.

Through a thorough examination of the weaknesses of systems, conspiracy can be viewed as a form of critique—a deceitful narration of legitimate practices. With the help of several members of the artist's own family, who offered specific expertise, he has conspired to create four subversive financial enterprises for the Arctic. Sitting somewhere between criminality, deceit and disruption, each enterprise seeks to exploit the unique infrastructure, ecology, potential for dispute, and legal ambiguity of the region to provide devious financial rewards.

Bio: Owen Wells' projects place objects as central figures within speculative narratives, viewing design as a means to explore, experiment, and define larger systems.



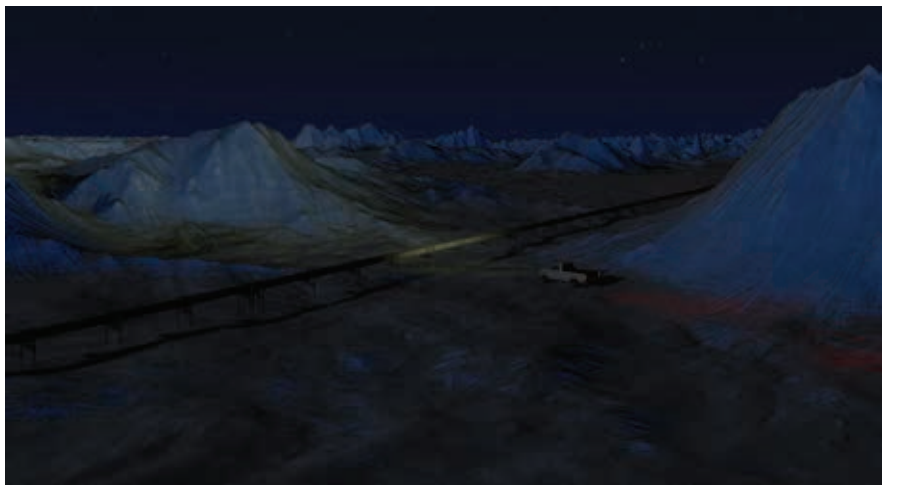


Image: Owen Wells

Mitigating

This is where things get very unusual indeed. Desperate times call for desperate measures and strange weather calls for creative mitigation strategies. This collection of tools and narratives ranges in tone from celebratory to cynical. Each artist in this section constructs a future where humankind attempts to use technology to directly intervene in the weather patterns on planet Earth.

Although humans have informally and inadvertently manipulated the weather since at least the dawn of agriculture, and definitely since the large scale burning of fossil fuels, these projects ask what happens when we start trying to shape the weather and control the climate intentionally, continuously and with specific outcomes in mind. The story of climate mitigation is only just beginning, but thus far we have learned: we have always been geoengineers and we have not been very good at it.

Cloud Pink

Everyware (KR)

2011

"Lying down on a hill with your pupils filled with the endless blue sky, perspective of your eyesight suddenly gets distorted and clouds drift at the tip of your nose. You stretch your arms up to the sky to touch the clouds but can't reach."—Everyware

Wouldn't it be amazing if we could feel the clouds at our fingertips? Touch the clouds drifting on a giant fabric screen and remember the clouds and dreams of your childhood.

This interactive piece relies on depth-sensing technology to simulate a world where humans can reach up and manipulate weather patterns with their own bodies.

Bio: Everyware is a creative computing group by Hyunwoo Bang and Yunsil Heo. Everyware are new media artists exploring intuitive and interesting communications between the real and virtual worlds.

Image: Everyware

Eyes in Outerspace

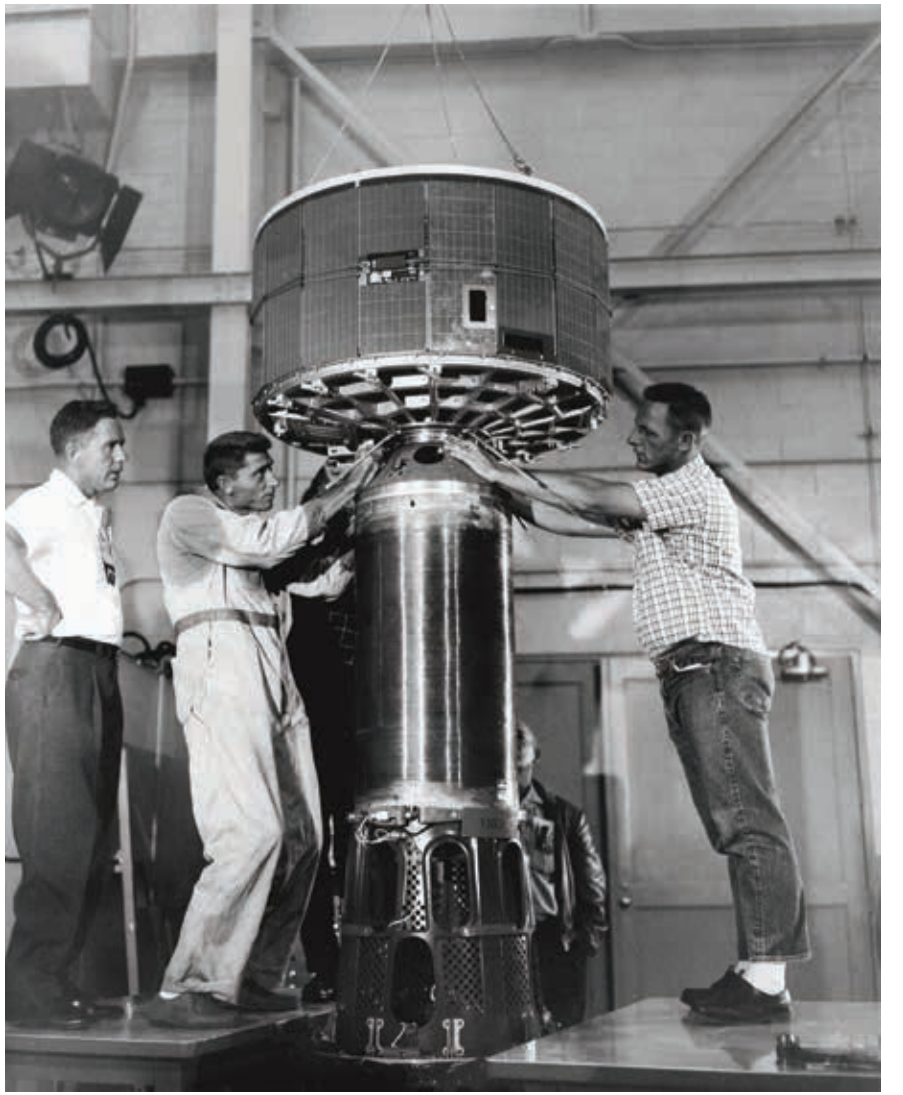
Walt Disney Productions (US)

1959

"Let us project our present knowledge with a little imagination and speculate on how satellites might be used in future operations from a world wide weather center… With the touch of a button, the battle begins." —*Eyes in Outerspace*

Eyes in Outerspace is a short film created in 1959 by Walt Disney Productions with the cooperation of the United States Department of Defense. The film speculates on the use of space technology and satellites to direct and control weather. Is this kind of militarised atmosphere a desirable outcome? If the technologies proposed in this video were proven to be effective, should they be employed? If so, by whom?

Bio: The Walt Disney Company, previously known as Walt Disney Productions and more commonly known as Disney, is an American media corporation headquartered at the Walt Disney Studios in Burbank, California. Disney was founded on 16 October 1923 by Walt Disney and Roy O. Disney as the Disney Brothers Cartoon Studio, and established itself as a leader in the American animation industry before diversifying into live-action film production, television, and theme parks.



TIROS, America's First Meteorological Satellite (1960)
Image: NASA

I Wish to Be Rain

Studio PSK (UK)

2013

One of the only certainties in life is that of death. Yet, it has been subject to far less technical and social (re)evolutions when compared to all the other aspects of modern life. Humans are now experimenting with technologies that allow them to affect and possibly control meteorological phenomena. We wonder if a person could do this not just by their actions, but literally transform themselves into a type of natural spectacle.

Cloud seeding is a way to intentionally modify weather, in an attempt to trigger precipitation from clouds. Rain naturally occurs when water vapour condenses around dust particles in the atmosphere, but some scientists suggest this effect can be artificially instigated by dispersing silver iodide particles within a chosen cloud. Could a person have the option in their final will and testament to radically and ambitiously transform their body into rain using cloud seeding?

I Wish to Be Rain proposes a new ritual: Following a funeral and cremation of a body, the crematorium will give the bereaved an aluminium vessel that contains their loved ones remains and a dormant aerostat. When the family are ready, the encapsulated ashes are sent skywards tethered to a weather balloon, to be dispersed in the macroscopic structure of a cloud. The capsule becomes increasingly pressurised. At the point it reaches the troposphere, the highest point at which clouds form, the capsule bursts, dispersing the ashes into the clouds below. When dispersed into the clouds, the remains get enveloped into a macroscopic structure far beyond the most grandiose human experience. But this is short lived, again they enter the domain of the miniature, falling back to earth as raindrops, before eventually finding their way back into the sea.

Bio: Studio PSK, established by Patrick Stevenson-Keating, is a collaborative design studio based in South East London. Work focuses on the changing landscapes within technology, design, science and society. Studio PSK specialises in object orientated speculative design and design fictions.

Image: Patrick Stevenson-Keating

Urpflanze

Susana Soares (UK)

2014

Can or should we design plants adaptable to extreme weather conditions? Can we afford not to? The diversity of leaf shapes, sizes and structures allow plants to adapt to nearly every environment. The precise molecular switches that control that process are being unveiled. Researchers working on plant morphology are putting together the genetic blueprint that controls plant structure and shape. The findings could be the first steps to a new generation of plants that are more resilient to unpredictable weather patterns, meet the challenges of global demand for food, and even influence climate.

Urpflanze displays computer-generated images of plants that represent optimal macro scale designs for extreme weather conditions. The illustrations are inspired by plant morphology research from the Department of Animal and Plant Sciences at the University of Sheffield. It looks at the metamorphoses by which specific plants adjusted to certain living conditions and environment, such as duckweed to water and cactus waxy coatings to drought.

The project attempts to give a brief overview of current research and questions whether we can or should design specific adaptations to a rapidly changing environment.

Bio: Susana Soares' work explores the implications of the technological redesign of nature. Her projects involve developing collaborative frameworks between design and emerging scientific research towards public engagement and awareness.

Image: Susana Soares

The Weather War

Bigert & Bergström (SE)

2012

The Weather War addresses problems faced worldwide due to global climate change. How do we behave to meet those challenges? Do we adapt? Or do we wage war against increasingly aggressive weather phenomena? Bangladesh is building protective walls against coming floods. China shoots rockets into threatening clouds. And in Italy, anti-hail cannons are fired to protect the year's wine harvest.

The film *The Weather War* tracks the history and contemporary struggle, between man and man-made climate, as we approach the tipping point. Together with the Canadian storm chaser and meteorologist Mark Robinson, Bigert & Bergström travelled to the Midwest in the US, to film and document the increasingly hostile weather patterns that are developing today.

In a blend of land art performance and road movie, the artists journey to the American tornado belt with their special machine-sculpture, the Tornado Diverter. The goal: to stop a tornado. The film incorporates historical examples of how the science of meteorology developed in symbiosis with military goals, and how these visions evolved into modern ideas of geoengineering. These are controversial ideas with socio-political consequences, spotlighting the big question of who is really entitled to modify weather.

Bio: Bigert & Bergström are an artist duo living and working in Stockholm, Sweden. Throughout their career, Bigert & Bergström have produced and created art ranging from large-scale installations and public works, to sculptures and film projects. Often with a conceptual edge, the core of their work is placed at the junction between humanity, nature and technology, and investigates scientific and social topics discussed in contemporary society.

Image: Bigert & Bergström

Artists' Biographies

Irish Centre for High-End Computing
The Irish Centre for High-End Computing (ICHEC), founded in 2005, is Ireland's national high performance computer centre. Its mission is to provide high-performance computing resources, support, education and training for researchers in third-level institutions and, through technology transfer and enablement, to support Irish industries large and small to contribute to the development of the Irish economy.

CoClimate
CoClimate is an artist-led think tank that aims to explore and understand climate change from many perspectives. CoClimate looks at the history of human attitudes towards weather and climate, and considers future scenarios. From the scientific to the social, what can we expect in the coming decades?

Marina Zurkow
Marina Zurkow is a media artist focused on near-impossible nature/culture intersections such as invasive species and petrochemical interdependencies. She is a 2011 John F Simon Guggenheim Foundation Fellow and currently on faculty at ITP/Tisch School of the Arts/New York University.

Met Éireann
Met Éireann, the Irish National Meteorological Service, is a line division of the Department of the Environment, Community and Local Government. It is the leading provider of weather information and related services for Ireland. Their mission is to monitor, analyse and predict Ireland's weather and climate, and to provide a range of high quality meteorological and related information. The Met Éireann Library is the central repository for meteorology-related publications in Ireland. It provides information services to Met Éireann staff members and the general public.

Matt Kenyon
Matt Kenyon is an artist and educator who focuses on critical themes addressing the effects of global corporate operations, mass media and communication, military-industrial complexes, and general meditations on the liminal area between life and artificial life. SWAMP (Studies of Work Atmosphere and Mass Production) was founded in 1999 by artists Douglas Easterly and Matt Kenyon. Matt now runs SWAMP solo, in addition to being an Associate Professor in the School of Art and Design at the University of Michigan in the United States. Matt's work has received the distinguished FILE Prix Lux Art prize as well as first prize in VIDA 7.0 Art and Artificial Life competition, and has shown at the Museum of Modern Art, NYC; Exit Art, NYC; The Edith Russ Site for Media, Oldenburg, Germany; The Foundation of Art and Creative Technology, Liverpool, England; and SIGGRAPH Art Gallery, San Diego, California.

Lauren Thorson
Born in Des Moines, Iowa, Lauren Thorson received her M.F.A. from the Minneapolis College of Art & Design. She is fifty-percent of the design studio Studio Set and currently a Designer-In-Residence at the Visiting Faculty at Virginia Commonwealth University. She has exhibited and lectured nationally, worked as a designer and has been published internationally, recently being named one of The Walker Art Center's 'Ten Artists to Watch in 2013'. She has served as co-chair for the IEEE VIS Arts Program for the past two years, moving into the role of Design Chair of VISAP 2014 Paris, France. Her work is both client-based and self-initiated, ranging from traditional graphic design to more experimental visualisation systems, actively pursuing research in data visualisation with the University of Minnesota's Interactive Visualisation Lab since 2011.

Tania Kitchell
Tania Kitchell is a Canadian visual artist born in Saskatchewan who lives and works in Toronto. Her multidisciplinary art practice engages in an ongoing exploration of our relationship with nature and our perceptions of it. She studied at Parson's School of Design. Solo shows and group exhibitions include: *True North Contemporary art of the Circumpolar North*, Anchorage Museum, Alaska, Facing North, James Harris Gallery, *And the Fair Moon Rejoices*, Boston Centre for the Arts, *Lightness*, Diaz Contemporary, *We Can Do This Now*, The Power Plant Contemporary Art Gallery. Tania's work is included in public and private collections such as: William and Ruth True Collection, The King County Public Art Collection, TD Bank Group.

Amy Balkin
Amy Balkin's work involves land and the geopolitical relationships that frame it. Her projects address legal borders and systems, environmental justice, and the allocation of common-pool resources. These include the ongoing project *Public Smog*, and the initiation of *A People's Archive of Sinking and Melting* in 2011. She was a collaborator on *Invisible-5* in 2006, an environmental justice audio tour of California's I-5 freeway corridor.

FICTILIS
FICTILIS is the collaborative practice of media artist Andrea Steves and writer/artist Timothy Furstnau. They produce multimedia projects, exhibitions, and events, often in collaboration with other artists and institutions. They ran a studio/gallery in Seattle, WA from 2010–2012, where they were awarded a Seattle Storefronts Creative Enterprise Grant. Since 2012 they have curated shows and shown work at several Bay Area art spaces including The Lab, Zero1 Garage, The Red Poppy Art House, ProArts, Interface Gallery, and The Santa Cruz Museum of Art and History. Called "up-and-coming art revolutionaries" (*CityArts Magazine*, Seattle, WA), "a good idea factory" (Jen Graves, *The Stranger,* Seattle, WA), and "a team I would totally rob a bank with" (Joe Loya, former bank robber, San Francisco, CA), they aim to foster new

ways for cultural productions to reach diverse audiences, and seek to promote work that is aesthetically, conceptually, socially, and technologically engaging.

Alistair McClymont
Alistair McClymont graduated from the Royal College of Art sculpture MA in 2005. He lives and works in London. His work is a continuing process of discovery and experimentation, ranging across a variety of materials and practices. Each piece follows the last in a continual journey of investigation into cultural and physical phenomena. Recent work is underlined by a search for what it is to be human. This might be our position in time and space on a grand scale, or singular observations on subjects that fascinate him. Each piece takes a small subject area and breaks it down into something understandable and perhaps beautiful. At times artworks take the form of direct demonstration, or experimentation: phenomena are removed from the world and reduced to their essence. At other times the artworks are formed by phenomena: the sculpture, or image is created by a process that is out of his control and the final work points to that process. Underlying all the work is a deep concern for beauty and reason.

Jonas Hansen and Lasse Scherffig
Jonas Hansen is a designer and artist teaching at the Academy of Media Arts Cologne. He works with experimental interfaces and games that investigate the borders between the virtual and the real world. His works have been exhibited internationally.

Lasse Scherffig is an artist and scientist working on experimental computer science and cybernetics. He has exhibited internationally and published in numerous journals, conferences and books.

Karolina Sobecka
Karolina Sobecka is an artist, designer and director. Her artwork often engages public space and explores the way we interact with the world we create and imagine. Her recent projects focus on climate engineering as a way of investigating the values that drive technological innovation, and shape the philosophy that inscribes humans in nature. Karolina's work has been shown internationally, including at the V&A, MOMA Films, Beall Center for Art + Technology, Marfa Dialogues, Zero1 and ISEA, and has received awards, including from Creative Capital, Rhizome, NYFA, Princess Grace Foundation, Vida Art and Artificial Life Awards and Japan Media Arts Festival. Karolina is the founder and creative director of Flightphase, an art and design studio focused on emerging formats, and is currently a Visiting Artist at the School of the Art Institute of Chicago.

Rosie O'Reilly
Artist and designer Rosie O'Reilly is the Creative Director of Re-dress, an organisation set up to develop an awareness of the detrimental environmental and humanitarian impact of the fashion industry in Ireland and abroad. She is also the designer of Art & Fashion House 'We Are Islanders'.

Jodi Newcombe & Tega Brain
Tega Brain is an artist and engineer whose work rethinks the infrastructures, interfaces and institutions that structure our relationship with larger environment systems. She creates site-specific installations, dysfunctional devices, experimental infrastructures, speculative services and information visualisations (sometimes using underpants). With qualifications in both fine art and environmental engineering, her interdisciplinary practice explores science, ecology and engineering. In 2013 Tega was awarded a Creative Australia Fellowship for early career artists from the Australia Council for the Arts and has recently been in residence at New York University and at the School for Poetic Computation in Brooklyn.

Jodi Newcombe is a curator and creative producer specialising in artistic responses to environmental challenges. Jodi is Director of Carbon Arts, an organisation working to facilitate an increased role for artists in generating awareness and action on climate change. An environmental engineer and economist by training, Jodi is committed to multidisciplinary and creative approaches to progressing a low-carbon future.

Marina Zurkow, Oliver Kellhammer, Una Chaudhuri & Fritz Ertl
Marina Zurkow is a media artist focused on near-impossible nature/culture intersections, such as invasive species and petrochemical interdependencies. She is a 2011 John Simon Guggenheim Foundation Fellow and is currently on faculty at the Interactive Telecommunications Programme at the Tisch School of the Arts at New York University.

Oliver Kellhammer is a Canadian land artist, permaculture teacher, activist and writer. His botanical interventions and public art projects demonstrate nature's surprising ability to recover from damage. He was recently part of the Field_Notes—Deep Time residency with the Finnish Society of Bioart at the Kilpisjärvi Biological Station in Lapland/Finland.

Una Chaudhuri is Professor of English, Drama, and Environmental Studies at New York University. Her recent collaborative publications include The Ecocide Project Casebook: Research Theatre and Climate Change and Animal Acts: Performing Species Today.

Fritz Ertl teaches theatre at NYU's Tisch School of the Arts. In the past decade he has directed four projects dealing with various aspects of globalisation, the most recent being CARLA AND LEWIS, and The Ecocide Project.

The Yes Men
The Yes Men are a group who use any means necessary to agree their way into the fortified compounds of commerce, and then smuggle out the stories of their undercover escapades to provide a public glimpse at the behind-the-scenes world of big business. The stories are often both shocking and hilarious. They have been called "the Jonathan Swift of the Jackass generation" by author Naomi Klein.

The Yes Men have impersonated World Trade Organization, Dow Chemical Corporation, and Bush administration spokesmen on TV and at business conferences around the world. They do this (a) in order to demonstrate some of the mechanisms that keep bad people and ideas in power, and (b) because it's absurdly fun.

Owen Wells
Owen Well's projects place objects as central figures within speculative narratives, viewing design as a means to explore, experiment, and define larger systems. Design is something that often exists in the background. We have been saturated with beautiful, hideous, useful and irrelevant objects to the extent that most design fills a space we barely register. Yet, when exceptional circumstances dictate, such as when a disaster or crime occurs, we are reminded that objects also exist as equipment, evidence and artefacts. Here design becomes a medium to facilitate, document or critique systems that are often rendered intangible by their invisibility, scale or complexity.

Everyware
Everyware is a creative computing group by Hyunwoo Bang and Yunsil Heo. Hyunwoo Bang worked as an assistant professor of the New Media Lab in the School of Mechanical and Aerospace Engineering in Seoul National University. Yunsil Heo has an MFA from the Department of Design/Media Arts at the University of California, Los Angeles, and B.A. & Ph.D. from the College of Fine Arts at Seoul National University. Everyware are new media artists exploring intuitive and interesting communications between the real and virtual worlds. They have exhibited their works at festivals and in galleries, including SIGGRAPH 2008 Art Gallery and SIGGRAPH 2011 Art Gallery, Ars Electronica, the National Art Center Tokyo, Disseny Hub Barcelona and the V&A Museum.

Walt Disney Productions
The Walt Disney Company, previously known as Walt Disney Productions and more commonly known as Disney, is an American media corporation headquartered at the Walt Disney Studios in Burbank, California. Disney was founded on 16 October 1923 by Walt Disney and Roy O. Disney as the Disney Brothers Cartoon Studio, and established itself as a leader in the American animation industry before diversifying into live-action film production, television, and theme parks.

Studio PSK
Studio PSK, established by Patrick Stevenson-Keating, is a collaborative design studio based in South East London, with a fluid structure adaptable to both small and large projects. Work focuses on the changing landscapes within technology, design, science and society. Projects are explored across multiple media, scales and disciplines. Much of the studio practice is characterised by collaboration with leading research experts, scientists or practitioners from various industries. Studio PSK specialises in object orientated speculative design and design fictions, with a range of skills to create designs and art in the most appropriate media. The studio has exhibited work internationally in spaces including the TATE Modern, Selfridges (London), The V&A, Royal Albert Hall, Design Museum and Mudam Museum.

Susana Soares
Susana Soares work explores the implications of the technological redesign of nature. Her projects involve developing collaborative frameworks between design and emerging scientific research towards public engagement and awareness. She is Senior Lecturer at London South Bank University and has lectured internationally and presented her work at Caltech University, MOMAK, Kyoto and Parsons in New York. In addition, she has held research fellow positions at IMPACT! project, RCA and Materials Beliefs, Goldsmiths University of London. After completing a B.A. in Industrial Design she graduated with an M.A. in Design Interaction in Royal College of Art, London. Her work has been published within design and scientific publications such as *Wired, New Scientist* and *Nature*, and exhibited at the Museum of Modern Art in New York, MOMAK in Kyoto, Science Gallery in Dublin, Southbank Centre in London and The Royal Institution in London. Susana's work is in the permanent collection of MoMA New York.

Bigert & Bergström
Bigert & Bergström are an artist duo living and working in Stockholm, Sweden. They met while at the Swedish Academy of Arts in Stockholm in 1986 and have collaborated ever since. Throughout their career, Bigert & Bergström have produced and created art ranging from large-scale installations and public works, to sculptures and film projects. Often with a conceptual edge, the core of their work is placed at the junction between humanity, nature and technology, and investigates scientific and social topics discussed in contemporary society.

Strange Weather Curators

Zack Denfeld
Zack Denfeld is an artist, designer and educator working at the intersection of the natural, built and information environments. Zack cofounded the Center for Genomic Gastronomy (2010) and CoClimate (2014). Before that he worked in Bangalore, India helping to launch the Center for Experimental Media Art at the Srishti School of Art Design & Technology (2007) and worked with CKS on the Emerging Economy Report and with CSTEP's Next Generation Infrastructure Lab. Zack holds degrees from the University of Michigan and Syracuse University and is currently an assistant professor at PNCA's MFA in Collaborative Design in Portland, OR.

Cathrine Kramer
Cathrine Kramer is an artist, designer, researcher and curator working internationally. With a focus on food, technology and ecology, her experimental practice aims to discover the good, the bad and the ugly of life on Spaceship Earth. Since co-founding the Center for Genomic Gastronomy in 2010, she has been working collaboratively on its development. In 2014 she cofounded a new artist-led think tank with Zack Denfeld called CoClimate. She is a visiting lecturer in the Design & Environment MA at Goldsmiths College, London and is currently assistant professor at PNCA. Cat holds degrees from University of Technology, Sydney and Royal College of Art, London.

Gerald Fleming
Gerald Fleming is an Irish meteorologist and weather presenter. Gerald studied experimental physics at University College Dublin before joining Met Éireann in 1980. Having completed training as a meteorologist, he worked in aviation forecasting before transferring to general and media forecasting. He presented his first weather broadcasts on both radio and television in 1984. His career has spanned the era from cardboard charts and magnetic symbols to the computer-generated graphical wizardry of today. He became leader of the TV Weather Team in RTÉ in 1990 and co-founded the International Association of Broadcast Meteorology in 1994. In 2003 Gerald was promoted to Deputy Head of Forecasting for Met Éireann, and then to Head of Forecasting in 2008, the position he currently holds.

Lynn Scarff
Lynn began working with Science Gallery in 2006 with Founding Director Michael John Gorman, and in this time she has been involved in all aspects of the development of the organisation from the programmes delivered to the fundraising and marketing strategy behind them. With a background in informal education programmes, Lynn has produced a number of printed, online and broadcast resources in the areas of science, environmental education and the arts. Having come to Science Gallery via wildlife management, zoology and science communication, over the last fifteen years Lynn has been responsible for devising compelling programmes that engage diverse audiences on themes that cross boundaries and disciplines. From her work with Global Action Plan in Ballymun as part of the biggest regeneration project in Europe to consultancy work for Environmental Protection Agency, RTE, Dublin City Libraries and Youth Development Services — Lynn is driven by the quest to deeply engage broad audiences in science, the arts, design and technology.

Strange Weather Researchers
Zack Denfeld and Cathrine Kramer

Exhibition Design
Cathrine Kramer

Exhibition Production
THEWOODSHED

Graphic Design
Ruža Leko

Graphic Design Intern
Anne Marie Kobberø

Publication Print
Plus Print

Acknowledgements

A People's Archive of Sinking and Melting
Amy Balkin would like to thank contributors Jelena Adeli, Golnar Adili, Bill Burns, Jose Ramon Castelrau and his grandson, Adriane Colburn, Vreni Michelini Castillo, Laura Colomban, Wynell Davis, Monique Dean, Steve Desroches, LaShine Dickerson, Rodrigo Garcia, Ole Jørgen Hammeken, Tyler Henry, Nandor Kovats, Jesus Landin-Torrez III, Nenesinho, Bertrand Lozay, Ali Macdonald, Tyjunaique McKenzie, Gerd Mörsch, Micaela Neus, Milissa Orzolek, Sandhya Parajuli, Peter Peiser, Sabine Reinecke, Melanie Roumiguière, Guadalupe Schneider, Leo Sexer, Christine Shearer, Marcel Sparmann, Matt Swagler, Steve Sweet, Monika Szilabi, Elizabeth T, Pleasur'ne Thomas, Caroline Tripet, and co-registrars Cassie Thornton, Malte Roloff and Olga Kopenkina.

Cloud
Funding for this project was made possible by the Stamps School of Art and Design at the University of Michigan.

CoClimate
CoClimate would like to thank Emma Conley fro production assistance.

Dear Climate
The Dear Climate team would like to thank the New York University Visual Arts Initiatives Award and Sarah Rothberg.

Isobar Drawings
Science Gallery would like to thank Mairéad Treanor, the librarian at Met Éireann, for supplying the isobar drawings.

Raindrop
Alistair Clymont would like to thank C. P. R Saunders and B. S. Wong at Manchester University.

Talking About The Weather
FICTILIS would like to thank the staff of the Patrick J. Dowling Library at the Irish United Cultural Center of San Francisco.

The Atmosphere, A Guide
Amy Balkin would like to thank Susan Schwartzenberg, Peter Richards, Josh On, and Elizabeth Terzakis. The text, *Charting the Sky*, is by Megan Prelinger.

Weather Wars
Bigert & Bergström would like to thank the Russian scientist Vladimir Pudoc.

100 Year Climate Model of Earth
The climate visualisations were provided by the Irish Centre for High-End Computing (ICHEC). The simulations were run by Met Éireann and ICHEC on the ICHEC supercomputers.

Forecasts from the Future
The climate projections for Ireland in one script were provided by the Irish Centre for High-End Computing (ICHEC). The research was funded by the EPA.

Archive of Old and New Events
This project has been assisted by the Australian Government through the Australia Council, its arts funding and advisory body.

Urpflanze
Susana Soares would like to thank Monica Santos, Professor Andrew Fleming, Science Advisor at the Department of Animal and Plant Sciences; Professor Frank Wellmer, Wellmer Lab Director at Trinity College Dublin; and Lisa Egan, Ph.D. student at the Trinity Centre for Biodiversity Research at Trinity College Dublin.

Weather Betting:
The image "File:Met ireann (Irish Meteorological Service) (1387399963).jpg" by William Murphy (from Dublin, Ireland) was retrieved from Wikimedia Commons on June 27th, 2014and is licensed as (CC BY-SA 2.0).

About Science Gallery

Science Gallery at Trinity College Dublin is a dynamic and vibrant cultural space where science and art collide, ideas meet, and curious minds connect. Featuring work by both national and international scientists, artists, engineers, designers and technologists, Science Gallery explores broad themes that can be interrogated from a variety of disciplines and perspectives. With a primary audience of young adults from 15 to 25 years old and a strong community that visits regularly, Science Gallery provides a lively social space for public engagement with science. Through an ever-changing programme of exhibitions, events and workshops, the space serves as a porous membrane for ideas and connection between the university and the city around it.

Science Gallery Supporters

Thanks to the generous support of its partners, Science Gallery develops four ground-breaking exhibitions in Dublin every year. Being a partner allows companies, foundations and individuals to enjoy a year-round association with Science Gallery and its work to ignite passion and creativity. If you're interested in joining Science Gallery to inspire the next generation of innovators and build a fresh start for Ireland's future, visit sciencegallery.com/support.

FOUNDING PARTNER	wellcome trust
SCIENCE CIRCLE	Deloitte. · ESB Energy for generations · Google · ICON A Symbol of Excellence · NTR FOUNDATION securing a greener future · Pfizer
FOUNDING PATRONS	DR MARTIN NAUGHTON · DR BEATE SCHULER · PACCAR
FOUNDING SCIENTIST	PROF. MICHAEL COEY
GOVERNMENT SUPPORT	An Roinn Ealaíon, Oidhreachta agus Gaeltachta / Department of Arts, Heritage and the Gaeltacht · An Roinn Post, Fiontar agus Nuálaíochta Department of Jobs, Enterprise and Innovation · SFI Science Foundation Ireland
EDUCATION PARTNER	intel
2014 PROGRAMME PARTNER	SEVENTH FRAMEWORK PROGRAMME · THEMARKER
STRANGE WEATHER SUPPORTERS	epa Environmental Protection Agency · seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND · SFI Science Foundation Ireland
	FACULTY OF ENGINEERING, MATHEMATICS AND SCIENCE
MEDIA PARTNER	THE IRISH TIMES

ISBN 978-1-56581-231-4