

## Acknowledgements

Our eyes are not cameras that just record images. They are actually part of a highly evolved and sophisticated seeing machine – that can sometimes (luckily not often) fool us! We hope this exhibition has helped you to see the world from a different perspective and that you'll keep talking to your friends, family and colleagues about vision once you leave!

None of this would be possible without funding from the Leverhulme Trust and the support and enthusiasm of colleagues across the University of Bristol. Particular thanks must go to the Bristol Eye Hospital, the staff of the Botanic Garden, BVI researchers and of course Luke Jerram. We are exceedingly grateful for

all the time he and his team have given us, producing this exciting exhibition, and allowing us to share his artwork and vision with you.

The Impossible Garden will be open throughout the summer of 2018 until 25th November. We encourage schools, children and adults with visual impairments, university staff and members of the public to come along and enjoy the tranquillity of this calming, green space.

Please tell your friends and tweet us @VisionInstitute or @BrisBotanicGdn by using #impossiblegarden. Let's get talking about vision!

Bristol Vision Institute is focused on addressing grand challenges in vision research, so we can better understand how humans and animals see. A better understanding of how sight has evolved will help us in the search for better treatments and support for people with visual impairments and to develop better machine-based vision systems. BVI is one of the largest vision groups in Europe with 170 associates from engineering, computer science, biological sciences, psychology, ophthalmology, history of art, film & television and medicine.

"One of my biggest challenges as a clinician is to explain to others what vision problems are like for those affected. I hope the Impossible Garden will promote understanding and stimulate debate about vision".

Cathy Williams,  
Reader in Paediatric Ophthalmology,  
Bristol Eye Hospital

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## The annual Richard Gregory Lecture

We are delighted Luke Jerram will be giving this year's Richard Gregory Lecture, "Exploring the Edges of Perception", at the University of Bristol, Tuesday 13th November, 6pm.

This annual lecture is held in memory of Professor Richard Gregory CBE FRS FRSE (1923-2010), a British psychologist, polymath and Professor of Neuropsychology. He is also the inspiration behind the formation of Bristol Vision Institute.

Luke's first artwork "Retinal Memory Volume" was inspired by Richard Gregory's book "Eye and Brain". During the lecture, he will talk through the principles and inspiration behind many of his artworks.

Visual illusions and the exploration of visual perception continue to be a part of Luke's

practice and he will share photos, films and tell stories about his artworks, some of which have never been made public before.

Booking is mandatory, and space is limited, please visit our website to secure your ticket: [bristol.ac.uk/richard-gregory-lecture](http://bristol.ac.uk/richard-gregory-lecture)



13th July to 25th  
November 2018

Open 10am to 4.30pm,  
7 days/week, including  
bank holidays

Admission £5.50  
(includes 50p gift aid  
donation)

Free to under 18s,  
Friends of the Garden  
and all University of  
Bristol staff and  
students

# The Impossible Garden



## Welcome to the Impossible Garden

What you are about to experience is the culmination of an exciting collaboration between Bristol Vision Institute, artist Luke Jerram and the University's Botanic Garden. The Impossible Garden uses sculptural installations to spark debate about how we see, and how visual impairments can affect our perception of the world around us.

"This exhibition, created as a set of experimental sculptural artworks, has provided me with an opportunity to explore new optical phenomena, test ideas and share my interest in visual perception with the public".

Luke Jerram

Luke Jerram, (well-known for the Museum of the Moon and his street pianos installation artwork) is red/green colour blind. Fascinated by the processes of visual perception, many of his artworks have explored the processes and limitations of vision and how the mind interprets the things we're looking at. Over nine months as artist-in-residence at the Bristol Eye Hospital, Luke deepened his knowledge of visual perception, spending time with visually-impaired children and learning about Bristol Vision Institute's research in this area.

The residency led to Luke's unique idea of the Impossible Garden, a set of experimental sculptural artworks, inspired by visual phenomena he explored as part of his residency. Whilst many of the exhibits are fun to engage with, the pieces also reveal the processes and limitations of our vision.

Reflect on this as you wander through the different habitats of the garden and please share your photos and thoughts by tweeting @VisionInstitute using #impossiblegarden.

"The collaboration with Luke is a fantastic opportunity for us to explore the power of visual illusions. Understanding how they work can tell us a lot about the properties and limitations of our visual system."

Professor David  
Bull, Bristol Vision  
Institute Director

"Sight is probably the most important sense with which to explore any garden and the best gardens use perspective to give an effect that they are larger than they actually are. Optical illusions are surprisingly common in the natural world. Whether you're attracting pollinators or designing a vista, the ability to use colour, camouflage and perspective is vital to plants and gardeners alike."

Nick Wray, Botanic Garden Curator

### Stay connected

@VisionInstitute | @BrisBotanicGdn  
#impossiblegarden  
[bristol.ac.uk/vision-institute](http://bristol.ac.uk/vision-institute)  
[bristol.ac.uk/botanic-garden](http://bristol.ac.uk/botanic-garden)  
[bristol.ac.uk/engineering](http://bristol.ac.uk/engineering)

[bristol.ac.uk](http://bristol.ac.uk)

A unique collaboration  
with artist, Luke Jerram,  
exploring the edges of  
perception, helping us  
to see the world from a  
different perspective.



# Impossible Garden exhibits

## 1 DAZZLE

**LUKE:** Standing like a giant flower in the landscape, I'm interested how plants and animals use optical effects to communicate, sometimes to disguise themselves. I enjoy how optical illusions like this reveal the processes and limitations of our senses.

**BVI:** We think of movement as being a physical property of things. However, this pattern is stationary. The illusory motion is stronger when we move our eyes, suggesting that the illusion comes from an interaction between the motion on the retina when the eyes move, and the spatial structure in this particular pattern.

## 2 UPON REFLECTION

(Sponsored by The Leverhulme Trust)

**LUKE:** Most of the time, our brain helps us to decide quickly what we are looking at. I like the idea that the weather, and time of day, will change how easy this text is to read. This artwork is a nod to Britain's current state of flux.

**BVI:** When we "see" and recognise something like a word or a shape, it is because our minds put together elements of the scene and decide what it might be – even if it isn't really there! Our ability to do this varies with both

external conditions and prior knowledge.

## 3 LOST

**LUKE:** I've long wanted to create an 'out of focus sculpture'. An object that, no matter how close you get or what glasses you wear, will always be out of focus. This is my first experiment with this simple idea.

**BVI:** For people with good vision, objects can be seen clearly, especially by moving closer. However, for those with reduced visual acuity, everything will look blurred. For some, the blur may create a sense that the person is moving when clearly they aren't!

## 4 SHRINKING DEVICE

**LUKE:** I like the way objects of the wrong scale seem to shift our sense of perspective. We feel closer to, or further away from them than we actually are. Does sitting on this bench make you look small? Do you feel small when you sit here?

**BVI:** Objects that are familiar to us, like a bench, have an expected size. The brain then uses the expected size of an object and its actual size on the retina to infer how far away an object is. When objects are not their expected size, this causes distortions in perspective.

## 5 PIXEL GIRL

**LUKE:** An experiment in creating imagery and objects from pixels. I'm interested in how this object looks, and is understood, from different distances.

**BVI:** There are limits to vision and one is our ability to resolve fine detail. When we view the girl from further away we are unable to see the individual blocks that form this image. It is only as we move closer that we see the individual blocks and that there is something unnatural about the sculpture.

## 6 GLITCH

(Sponsored by The Leverhulme Trust)

**LUKE:** Are objects and images containing digital glitches new forms of visual illusion? Would someone from a different century even recognise a digital glitch? This is my first experiment in creating a three dimensionally glitched object.


**BVI:** We are used to glitches in streamed digital video – caused by poor channel reception or buffering problems. Blocks or lines in a video appear in the wrong position. This exhibit brings this phenomenon to life in a 3D physical entity you can touch and sit on!


# Map and exhibits


For each exhibit, Luke Jerram shares the inspiration behind each sculpture, followed by a comment from a vision research perspective.





- 1 DAZZLE
- 2 UPON REFLECTION
- 3 LOST
- 4 SHRINKING DEVICE
- 5 PIXEL GIRL
- 6 GLITCH
- 7 SHRINKING VIOLET
- 8 THRESHOLD
- 9 CONCENTRATE
- 10 IS THIS RED?
- 11 LANDSCAPE
- 12 MOTHER AND SON

Welcome Lodge and Garden Entrance 

First aid in Welcome Lodge, Reception, Devers Room and Glasshouses 

Toilets – follow path by wall and turn left 

Refreshments from Devers Room and West Terrace 

Emergency/fire muster point 

## 7 SHRINKING VIOLET

**LUKE:** I'm interested not only in flowers and how they've evolved to use bright colours and optical effects to attract bees and other pollinators, but that this image makes you feel queasy.

**BVI:** Patterns that induce visual discomfort, including feeling nauseous, may well be particularly unnatural ones. When we artificially produce stimuli that we haven't evolved to cope with, this can produce illusions and sometimes visual discomfort.

## 8 THRESHOLD

**LUKE:** "If the doors of perception were cleansed, everything would appear to man as it is, Infinite. For man has closed himself up, till he sees all things thro' narrow chinks of his cavern." This quote by William Blake reminds us our senses are just filters to the world. Where does this doorway take us?

**BVI:** Billions of photons enter the eye every second, yet the human optic nerve contains only one or two million nerve fibres. As a result, all visual systems take 'short-cuts' that, under most conditions, allow sensible decisions about the world. But those short-cuts mean perception is not reality, and visual systems can be fooled.

Illusions are a guide to how minds reconstruct a useful, but not accurate, world.

## 9 CONCENTRATE

**LUKE:** Artists often use visual illusions in their artwork. Sometimes they even have to counter an illusion to ensure they don't occur. Placing this simple illusion in the Chinese herb garden, just seemed to make sense.

**BVI:** Animal camouflage has evolved to manipulate the perception of the viewer: blending in, creating false edges, disguising or misrepresenting identity. If concealment is impossible, high contrast 'dazzle' coloration can confuse a predator. We need to understand the vision of other species to understand their colours, but their colours also give us a window on other minds.

## 10 IS THIS RED?

**LUKE:** One in twenty males is red/green colour-blind, so some visitors may not be able to spot this text. I am red/green colour-blind, which makes my work as an artist tricky at times! However, I always remind myself that what we see is limited not only by our senses, but is also highly affected by our previous experience and knowledge.

**BVI:** Most mammals are red-green colour-blind; but not birds, many reptiles and fish. These species have FOUR primary colours, including ultraviolet, not three as in most humans. So, a bird, a

turtle, or even the humble goldfish, would view all humans as 'colour-blind'. Feel free to try on special glasses which enhance colour. Made by Enchroma, they are designed to help counter the affects of red green colour blindness.

## 11 LANDSCAPE

**LUKE:** A six-sided mirrored room has been placed in the garden. Whatever is in this space, is reflected infinite times, creating an illusory landscape to contemplate.

**BVI:** Even in a flat image there are many cues to depth; size; cast shade; partial occlusion; and the position in the image (objects closer to the horizon tend to be further away). Together these cues give us a strong sense of the image being real even if that scene doesn't really exist.

## 12 MOTHER AND SON

**LUKE:** Like all matter, we are essentially hollow. Our atoms are primarily empty space. Created from simple planes taken out of a 3D digital model, the figures appear solid from one angle and barely visible from others.

**BVI:** When we scan a volume, for example in medical imaging of our bodies using MRI, we sample the volume in sections or layers that combine to represent the entire 3D volume.