

GR

RGB

Process Book

Olivia Smith

Colour

noun

1. the property possessed by an object of producing different sensations on the eye as a result of the way it reflects or emits light.

Light

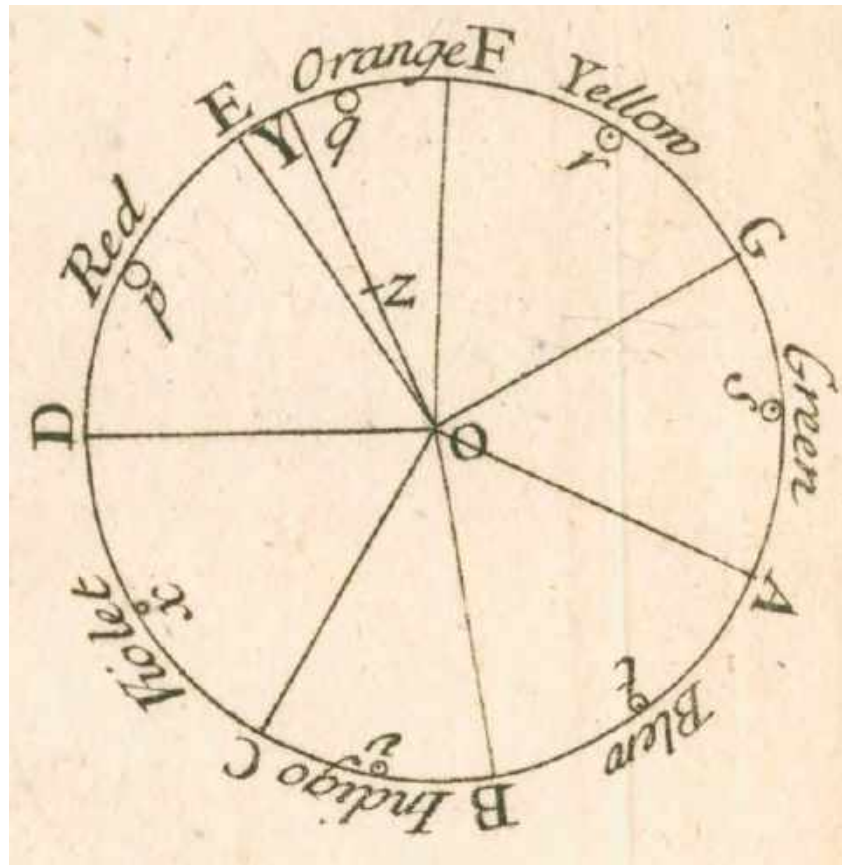
noun

1. the natural agent that stimulates sight and makes things visible.

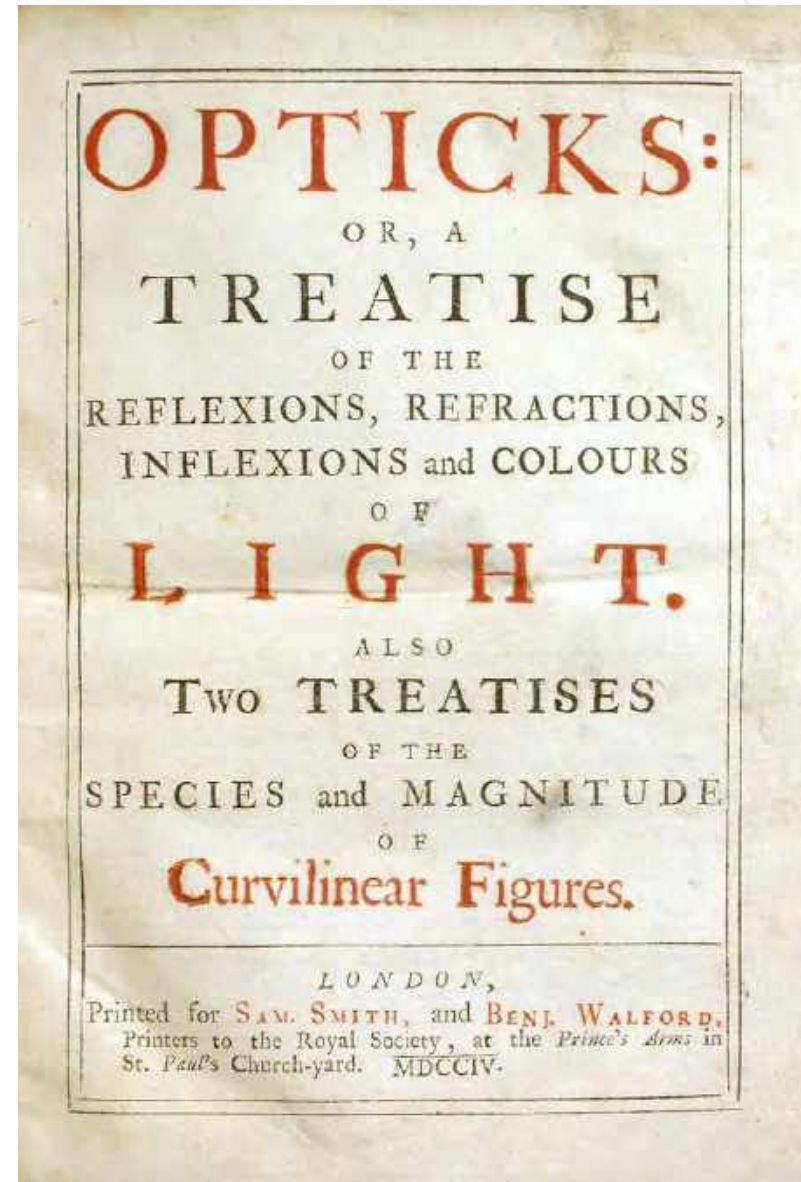
White light

noun

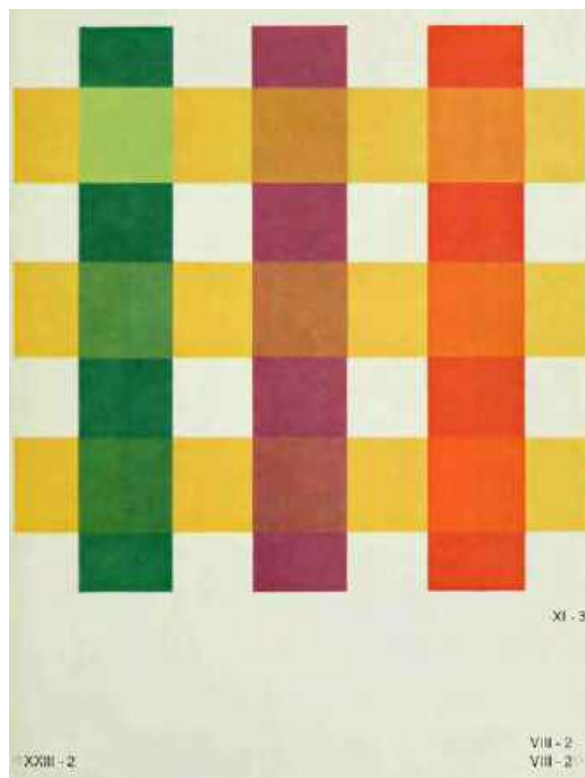
apparently colourless light, for example ordinary daylight. It contains all the wavelengths of the visible spectrum at equal intensity.



Isaac Newton's Colour Wheel, 1660



Opticks, Isaac Newton, 1704



Josef Albers, Interaction of Color, 1963

In visual perception a color is almost never seen as it really is - as it physically is. This fact makes color the most relative medium in art.

In order to use color effectively it is necessary to recognize that color deceives continually. To this end, the beginning is not a study of color systems.

Interaction of Color, 1963

Our eyes only detect three colours: red, green and blue. By combining these, however, we can perceive many different colours. By mixing red light and green light, for example, we can see yellow. If all three are mixed together we see white light. Objects absorb and reflect light differently. A lemon reflects yellow light, all the other colours are absorbed and so are not seen by our eyes.

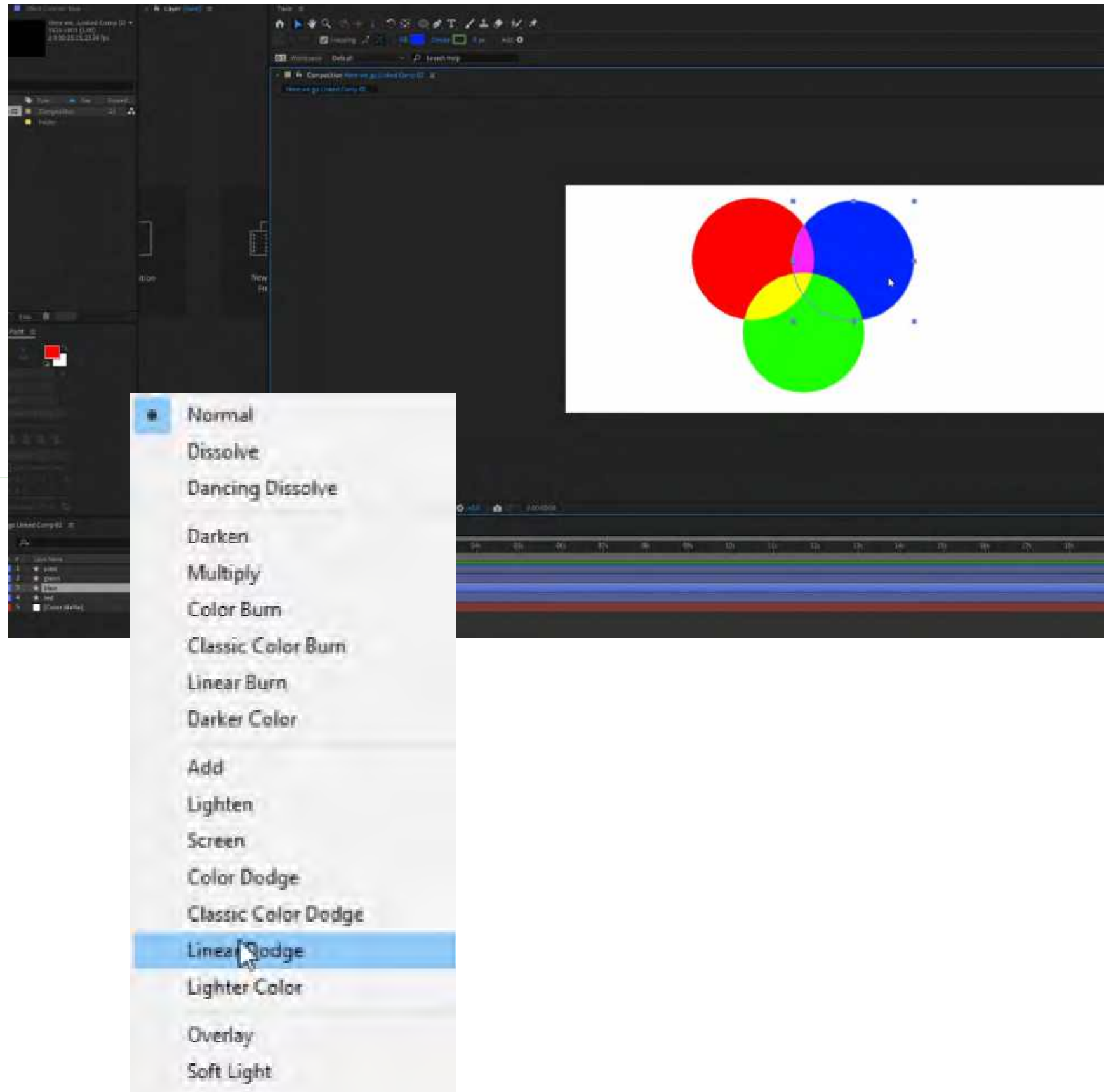
[BBC Bitesize, 1 minute 35 seconds video](#)

Sunlight is a combination of all visible colours, which is collectively known as white light. When white light hits a white object, all visible colours are reflected equally. This is because white doesn't absorb any colour, meaning we see it as white. The opposite happens when white light hits a black object, where all the colours are absorbed equally and reflect none, so all the eyes can see is black.

[Science Learning Hub, 2019](#)

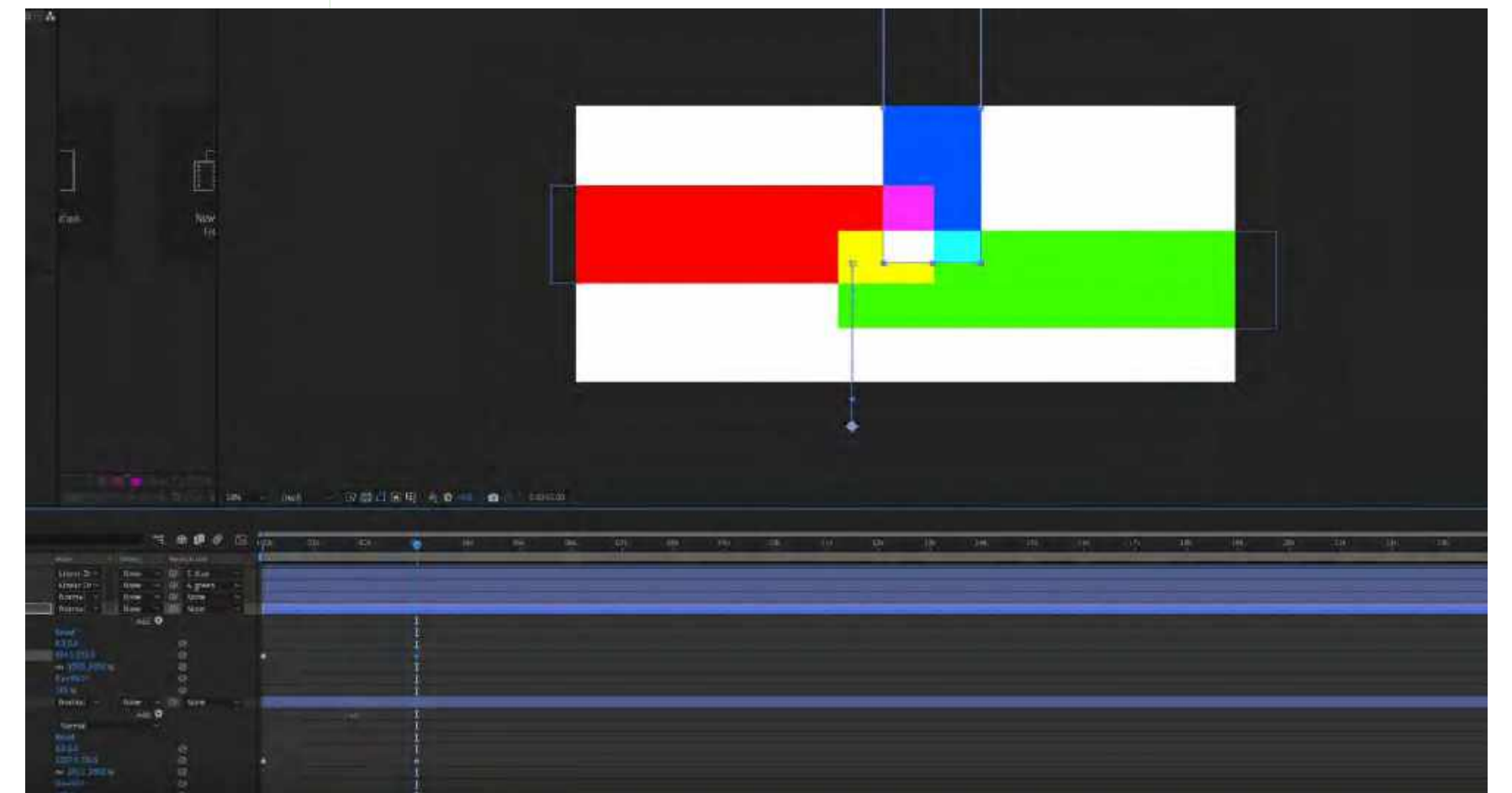
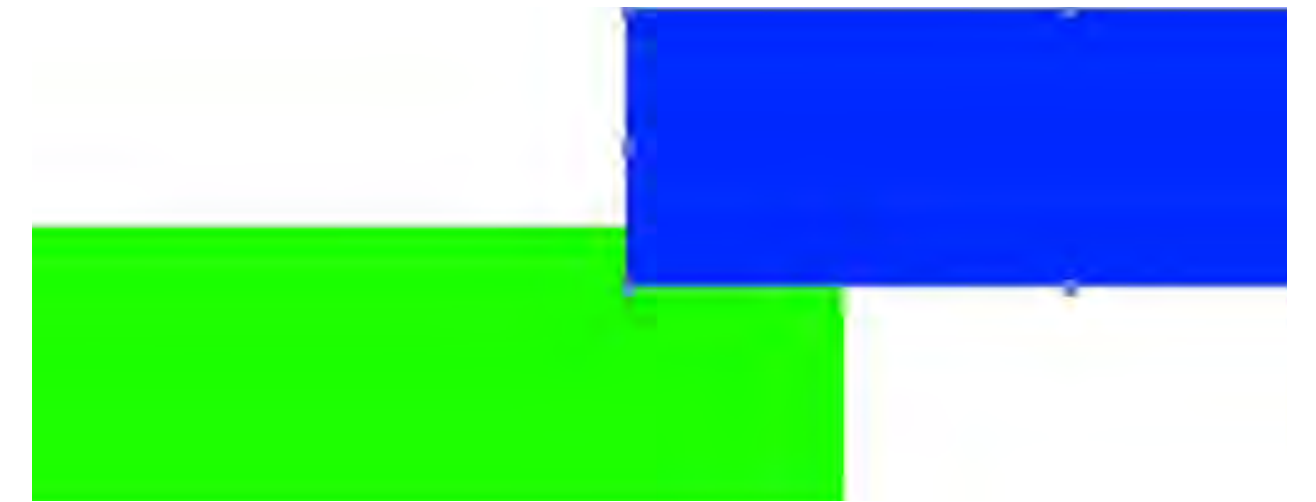
"The white light of the sun is made up of all the colours of the rainbow"

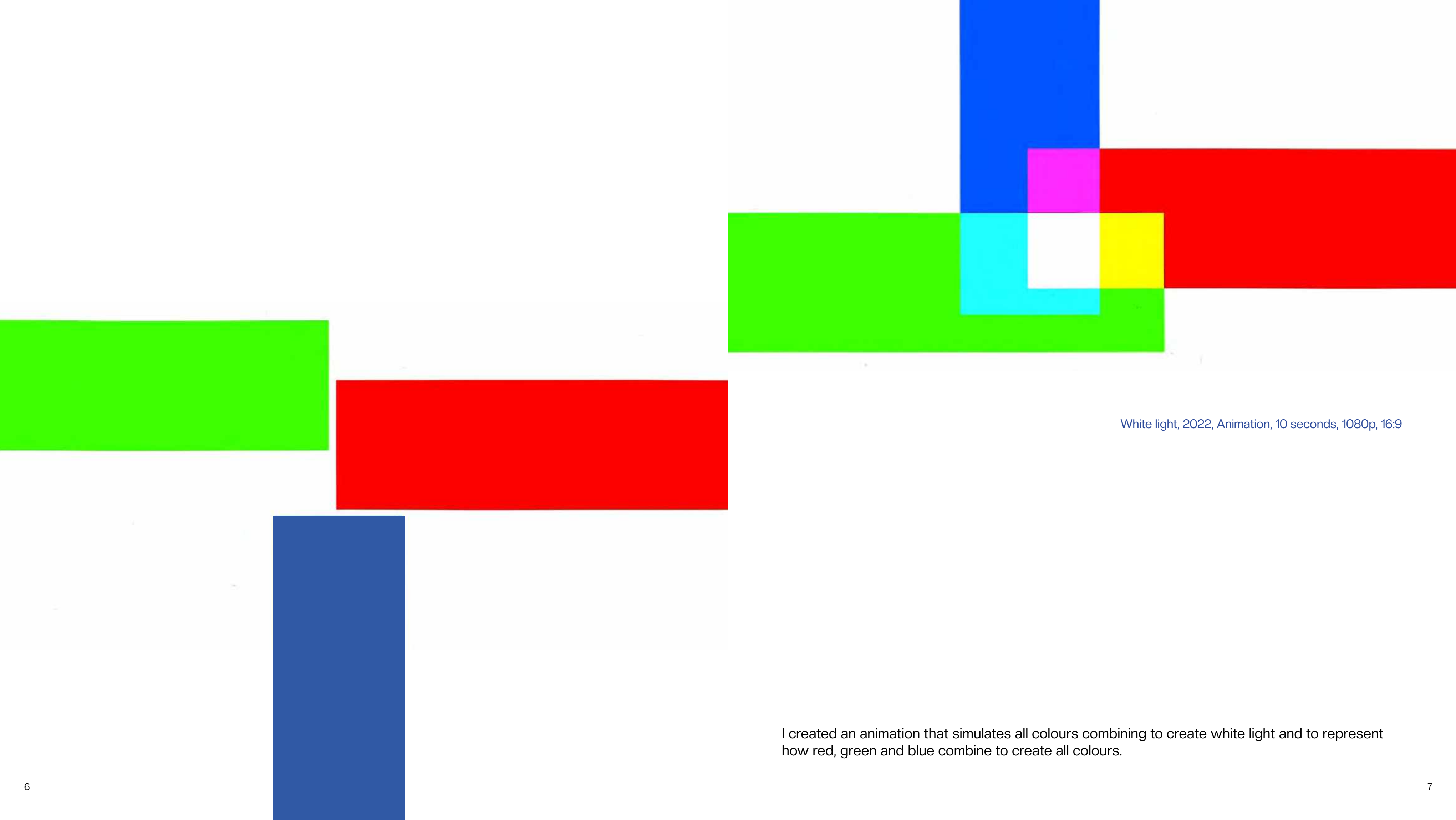
[Professor Brian Cox, BBC, 57 seconds video](#)



I experimented with colours in Adobe After Effects, trying to create and imitate how colours merge and combine in the real world. By using the effect 'Linear Dodge', it allowed me to re create the way colours combine with one another to create white light.

I wanted to make my own version of the well-known colour wheel we are all so familiar with, so instead of circles I went with rectangles, inspired by the work of Josef Albers and his own experiments with different colour interactions. Similar to his work of overlapping shapes and colours, I animated the rectangles overlapping each other, meeting in the middle to create the colour white, imitating the creation of white light.



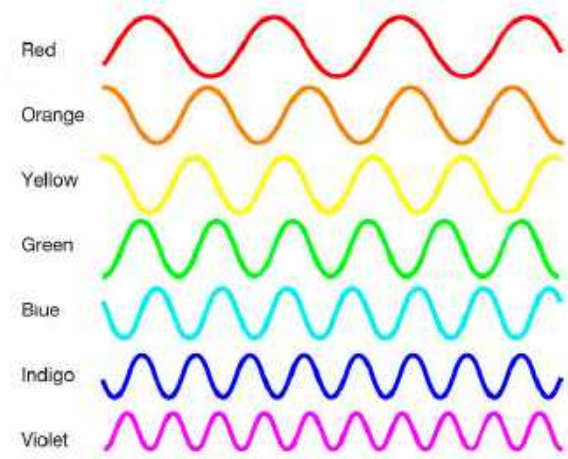


White light, 2022, Animation, 10 seconds, 1080p, 16:9

I created an animation that simulates all colours combining to create white light and to represent how red, green and blue combine to create all colours.



Camp Keyframe, 2021, 4 minutes 50 seconds video



NASA Science, 2010



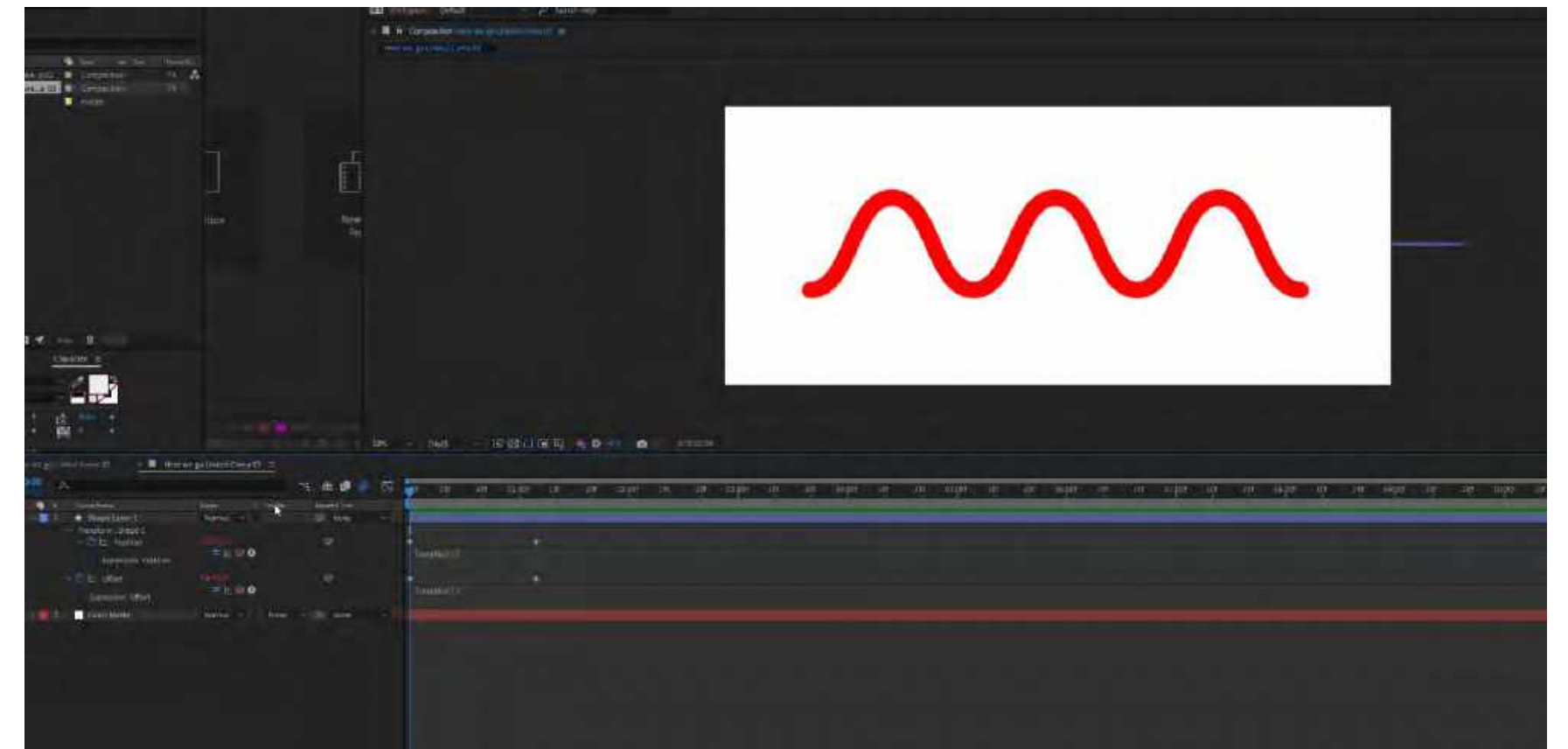
Visible Light, NASA Science, 2010, 4 minutes 49 seconds video

Visible light is the segment of the electromagnetic spectrum that the human eye can process. The colour of visible light depends on the wavelength, which range from 700 nm at the red end of the spectrum to 400 nm at the violet end.

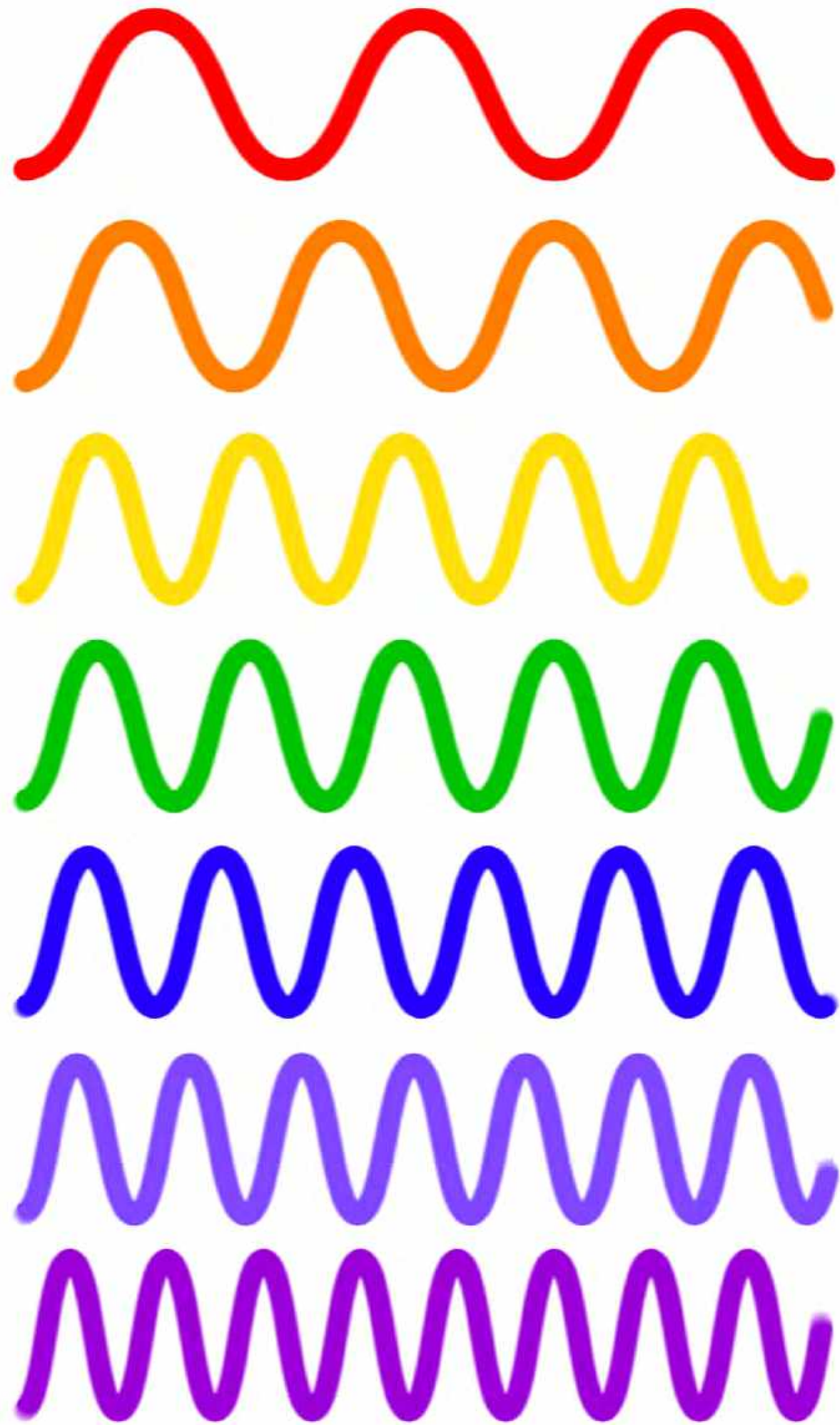
Wegman & Said, 2011



After furthering my knowledge on wavelengths and colour, I used this to continue with animation. I wanted to make the many diagrams of wavelengths, that I had seen, *move* to bring to life the visible light spectrum and to help educate about the difference between the wavelengths and nanometres of different colours, in a visual way.



Learning how to make waves in After Effects to imitate the way wavelengths look and to visually show the difference between them.



Visible Light Spectrum, 2022, Animation, 18 seconds, 1080p, 16:9

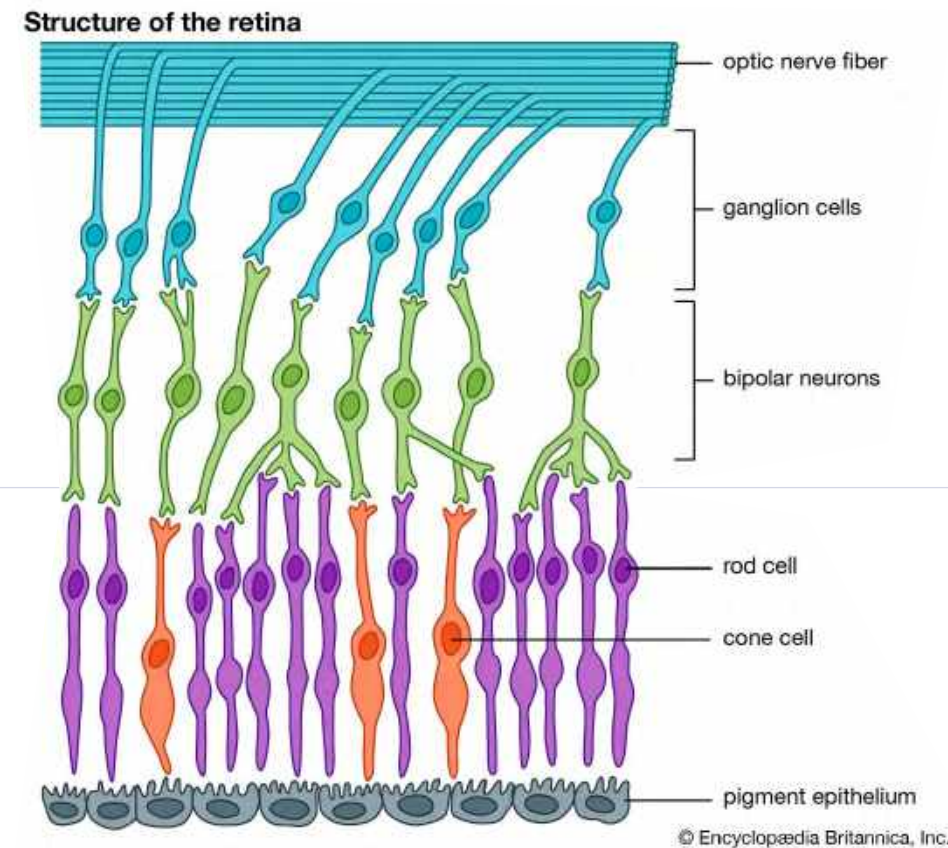
An educational animated video outlining the visible light spectrum and the difference between each colour wavelength.

The human eye can see colour by the light traveling into the eye, to the retina. The retina is the part of the eye that converts light into chemical energy, that sends a message to the brain to tell us what colour we see. It is made up of millions of light receptive cells called rods and cones. There is only one type of rod cell, they take over when there isn't enough light to see colour and help us to detect luminance (how light or dark it is).

[Perkins, 2001](#)

There are three types of cone cells that detect red, green, and blue. These cone cells detect the different wavelengths that have reflected off an object into the eye, which combine to create the colours we see.

[Wegman & Said, 2011](#)



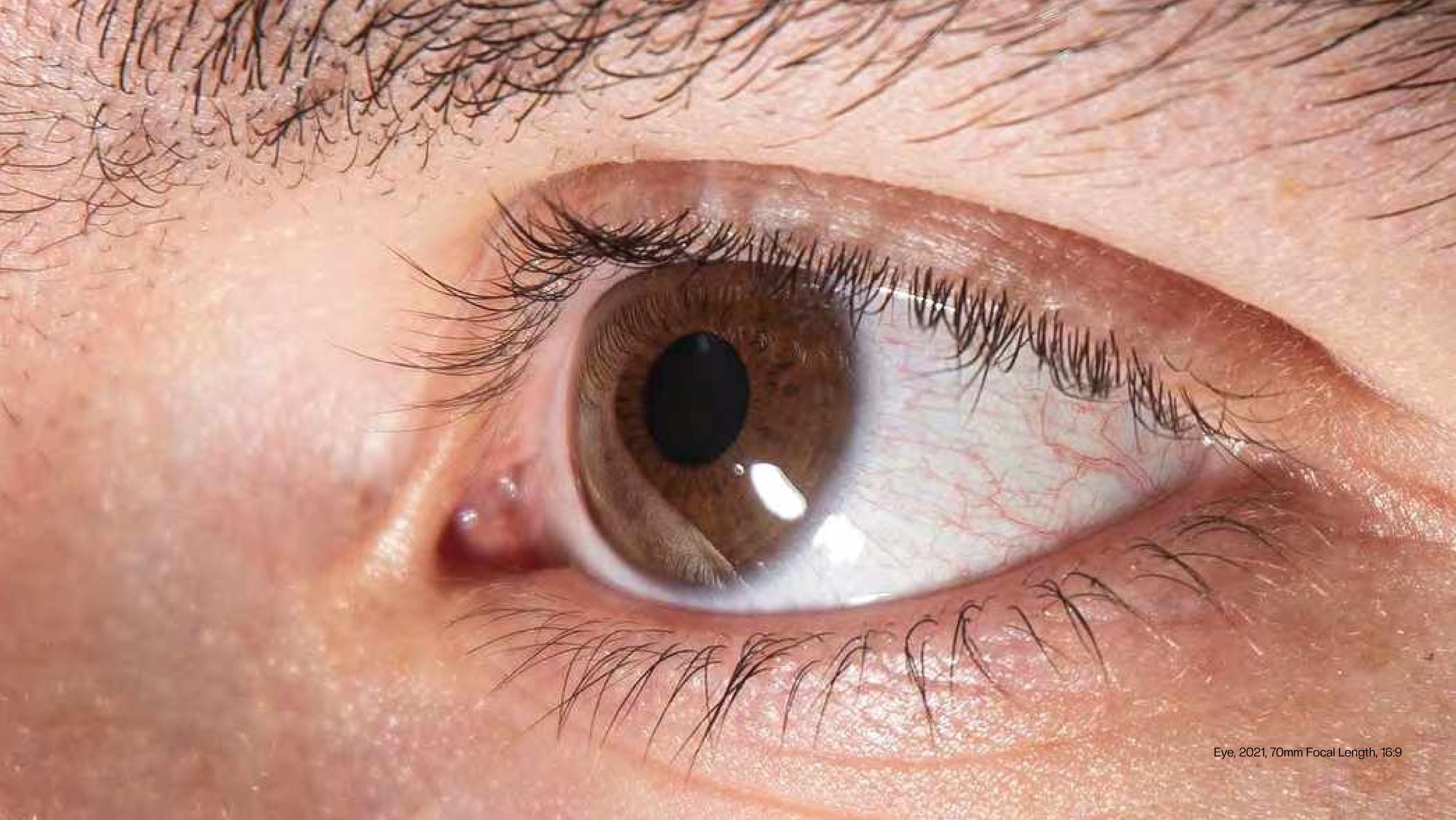
The retina is the part of the eye that receives the light and converts it into chemical energy. The chemical energy activates nerves that conduct the messages out of the eye into the higher regions of the brain.

[Encyclopædia Britannica](#)



I took photos of an eye for my own reference. I wanted to take a closer look at the eye, how it moves, looks and works.

For these images I used a Nikkor 18-70mm lens, set to a 70mm focal length.





Thomas Shahan, 2009

Thomas Shahan is a macro lens photographer, who works mainly with wildlife and bugs. His work is beyond my comprehension of real. I think the world of macro photography is amazing, with its ways of showing us things that are far too small for the human eye to naturally see.



Reverse adapter

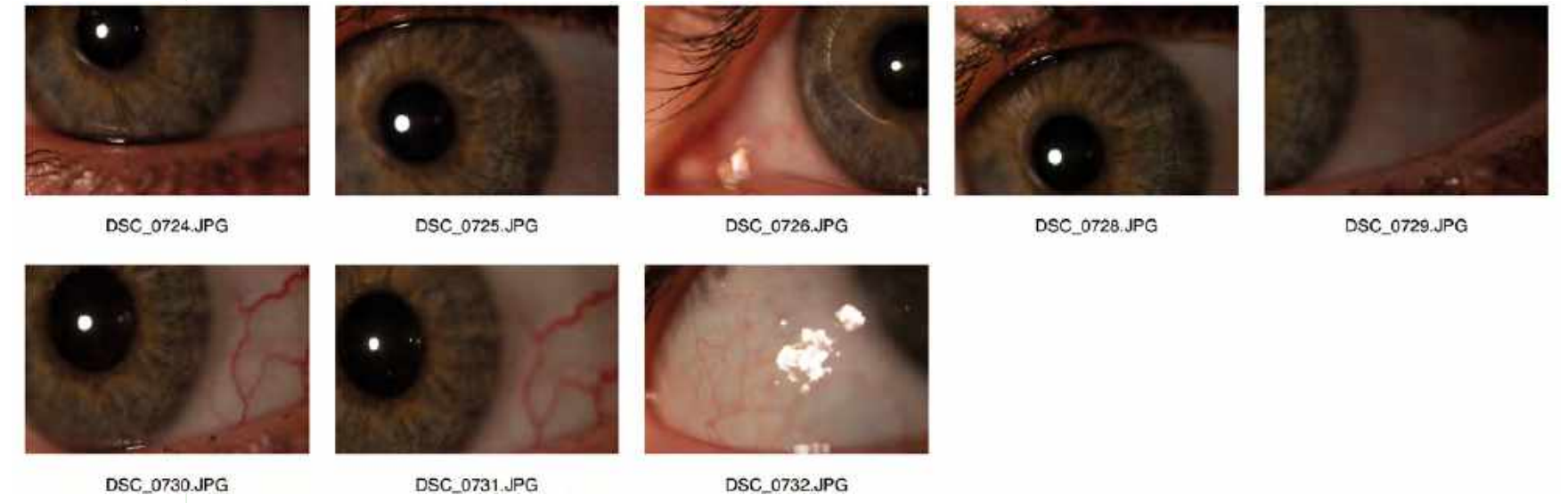


Makinon 28mm lens

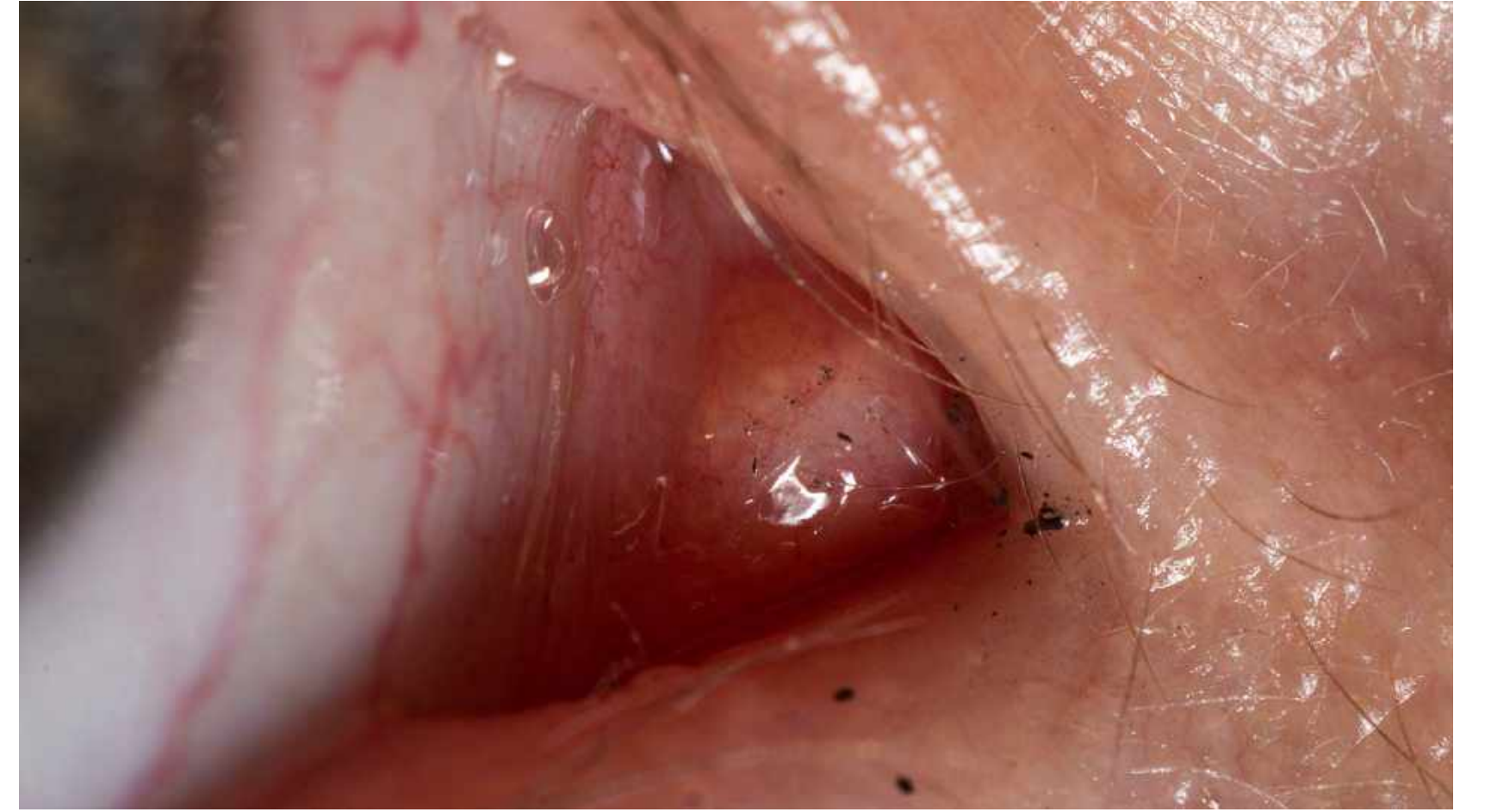
In order to achieve work similar to the work of Thomas Shahan I needed a macro lens. Using a reverse adapter on the lens would allow for me to get even closer to the eye.



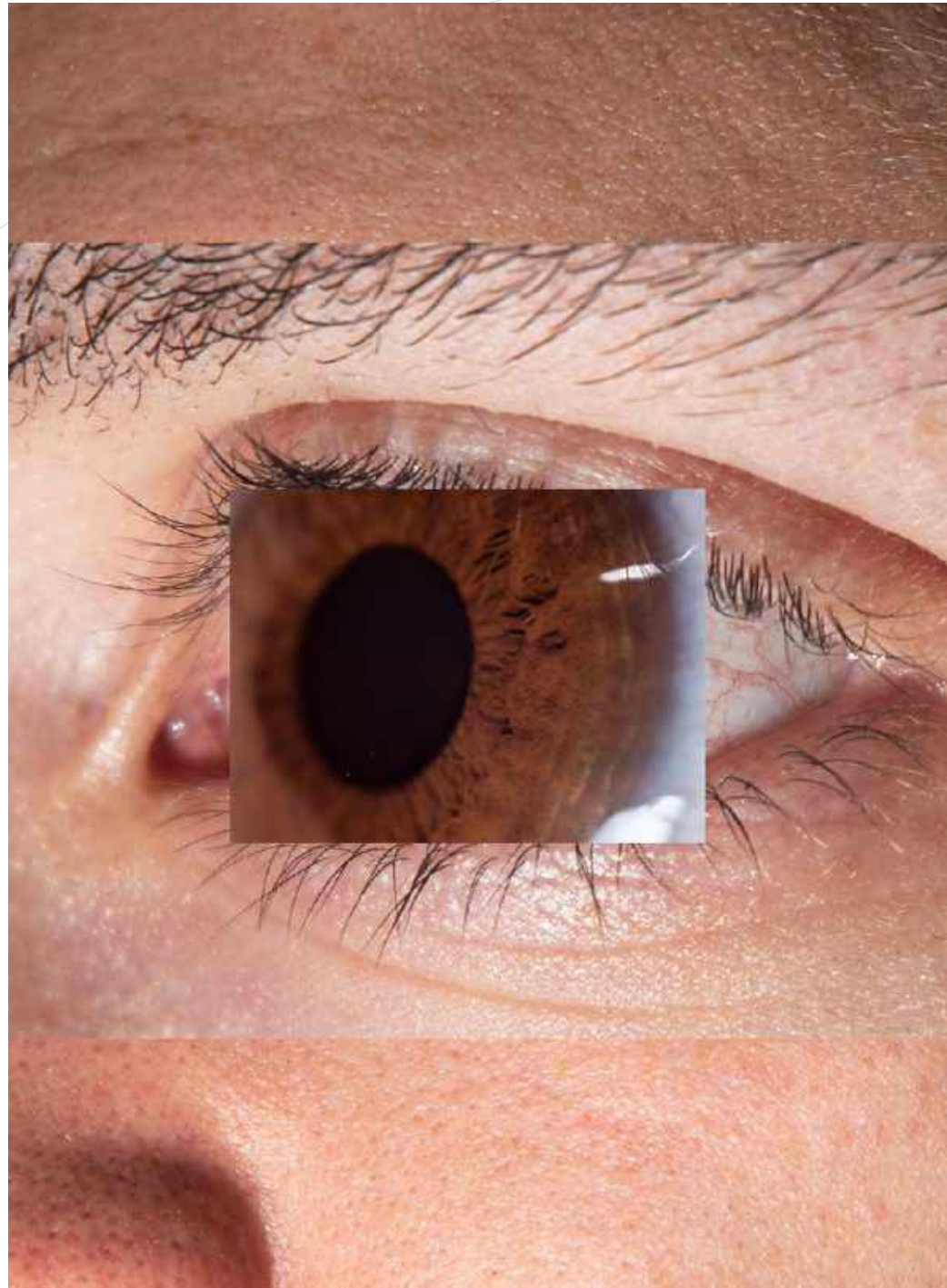
For these images I used a Makinon 28mm lens, mounted in reverse. I used a white light with a diffuser.



For these images I used a Makinon 28mm lens, mounted in reverse. I used a warm light with no diffuser. The brighter light with no diffuser allowed for better quality images and more detail to be captured. I think this worked out for the better as the warmer results were a lot more inviting and suited the subject of something natural, instead of the white light, which gave off a colder appearance



Into the unknown, 2021, 28mm Focal Length



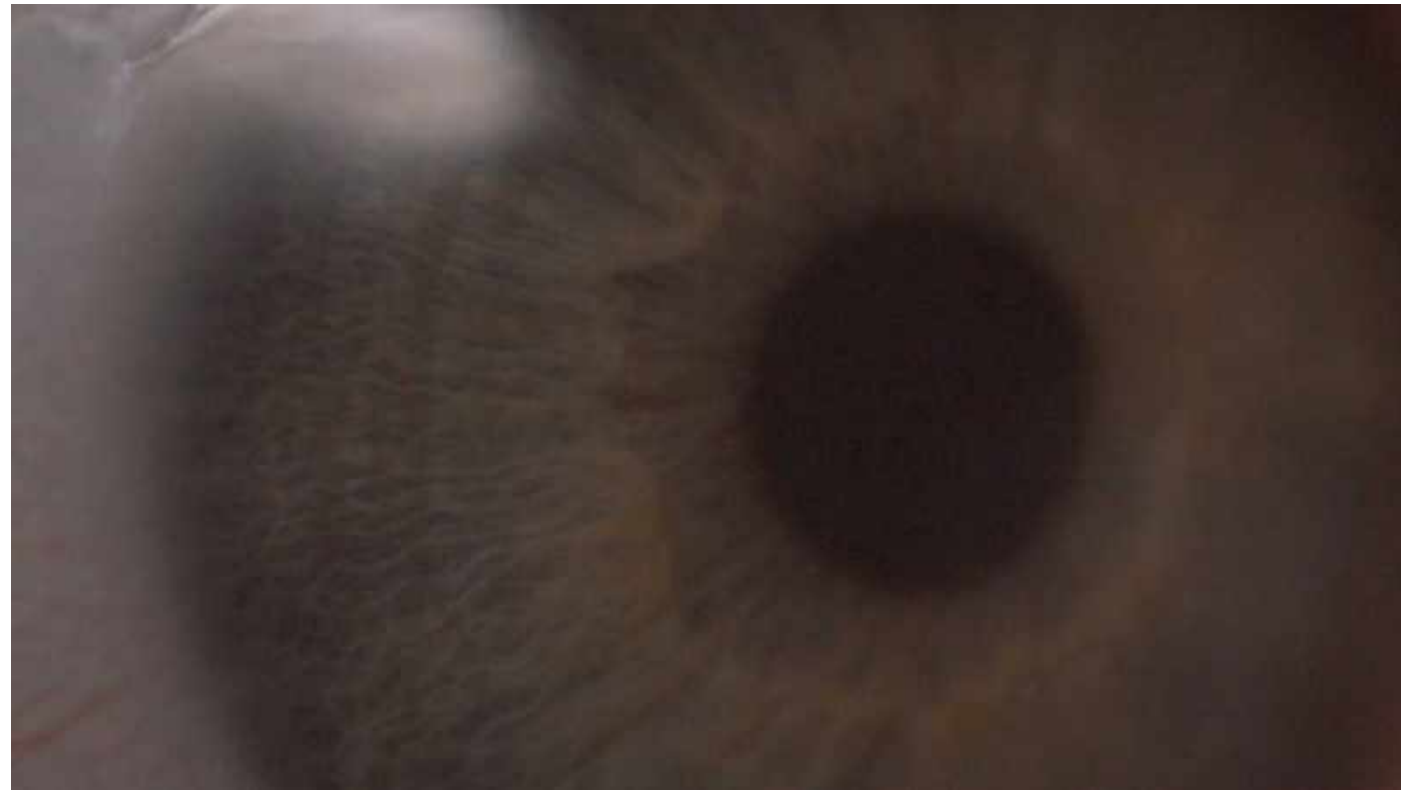
Work in Progress, 2021

This piece was a quick turnaround, for an exhibition. I took this opportunity to look at what I already had and make a piece of work that would outline my experience within my project so far. I made a collage of my photography, using three images, that had been taken with different lenses and focal lengths. I wanted to imitate the journey of my own experience whilst experimenting with different lenses, getting closer to the eye.

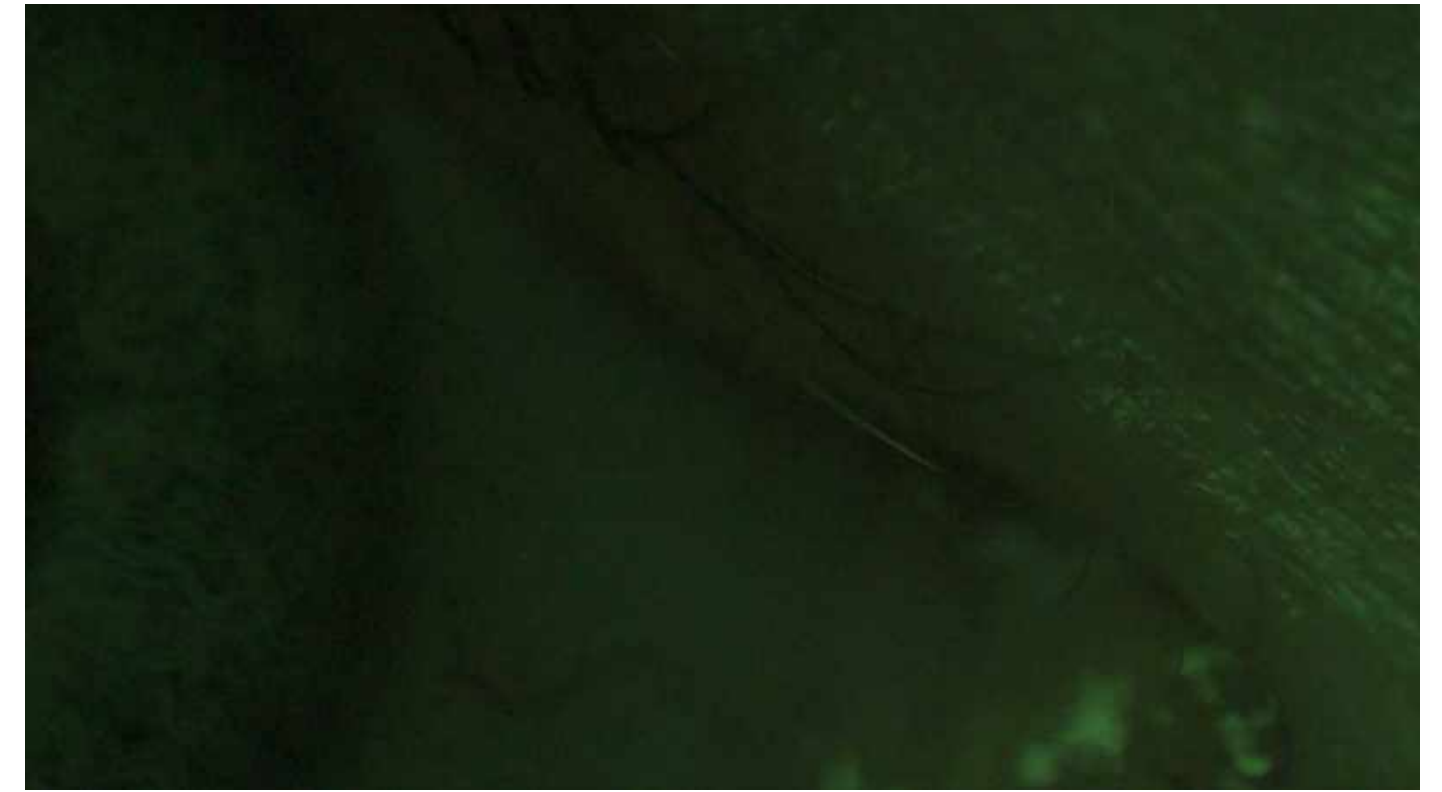
This piece was presented on the floor, which I didn't feel was very fitting for my work but I still think with the short time frame to get it presented and considering the board which I presented it on, it worked well enough but I do take this into consideration for exhibitions in the future.



Work in Progress, 2021, Cartridge paper, A1
@ Birmingham School of Art



No colour filter



Blue colour filter



Green colour filter



Red colour filter

I started experimenting with colour filters whilst recording my eye to see what sort of effect it would have, but I didn't feel that they were adding to the work in a way that I wanted it to be perceived. Adding colour at this stage of my project felt wrong as it did change the way that the eye looked and I was solely trying to show the details at this point.





DSC_1146 2.00_00_17.Still001.jpg DSC_1146 2.00_00_22.Still002.jpg DSC_1146 2.00_00_03_05.Still003.jpg DSC_1146 2.00_00_03_09.Still004.jpg DSC_1146 2.00_00_05_02.Still005.jpg



DSC_1146 2.00_00_05_08.Still006.jpg DSC_1146 2.00_00_07_07.Still007.jpg DSC_1146 2.00_00_09_09.Still008.jpg DSC_1146 2.00_00_10_18.Still009.jpg DSC_1146 2.00_00_11_23.Still010.jpg



DSC_1146 2.00_00_13_06.Still011.jpg DSC_1146 2.00_00_17_00.Still012.jpg DSC_1146 2.00_00_19_00.Still013.jpg DSC_1146 2.00_00_20_07.Still014.jpg DSC_1146 2.00_00_24_21.Still015.jpg



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DSC_1146 2.00_01_25_01.Still041.jpg DSC_1146 2.00_01_30_19.Still042.jpg DSC_1146 2.00_01_30_21.Still043.jpg DSC_1146 2.00_01_34_14.Still044.jpg DSC_1146 2.00_01_37_06.Still045.jpg



DSC_1146 2.00_01_39_18.Still046.jpg DSC_1146 2.00_01_42_14.Still047.jpg DSC_1146 2.00_01_42_17.Still048.jpg DSC_1146 2.00_01_42_19.Still049.jpg DSC_1146 2.00_01_47_08.Still050.jpg

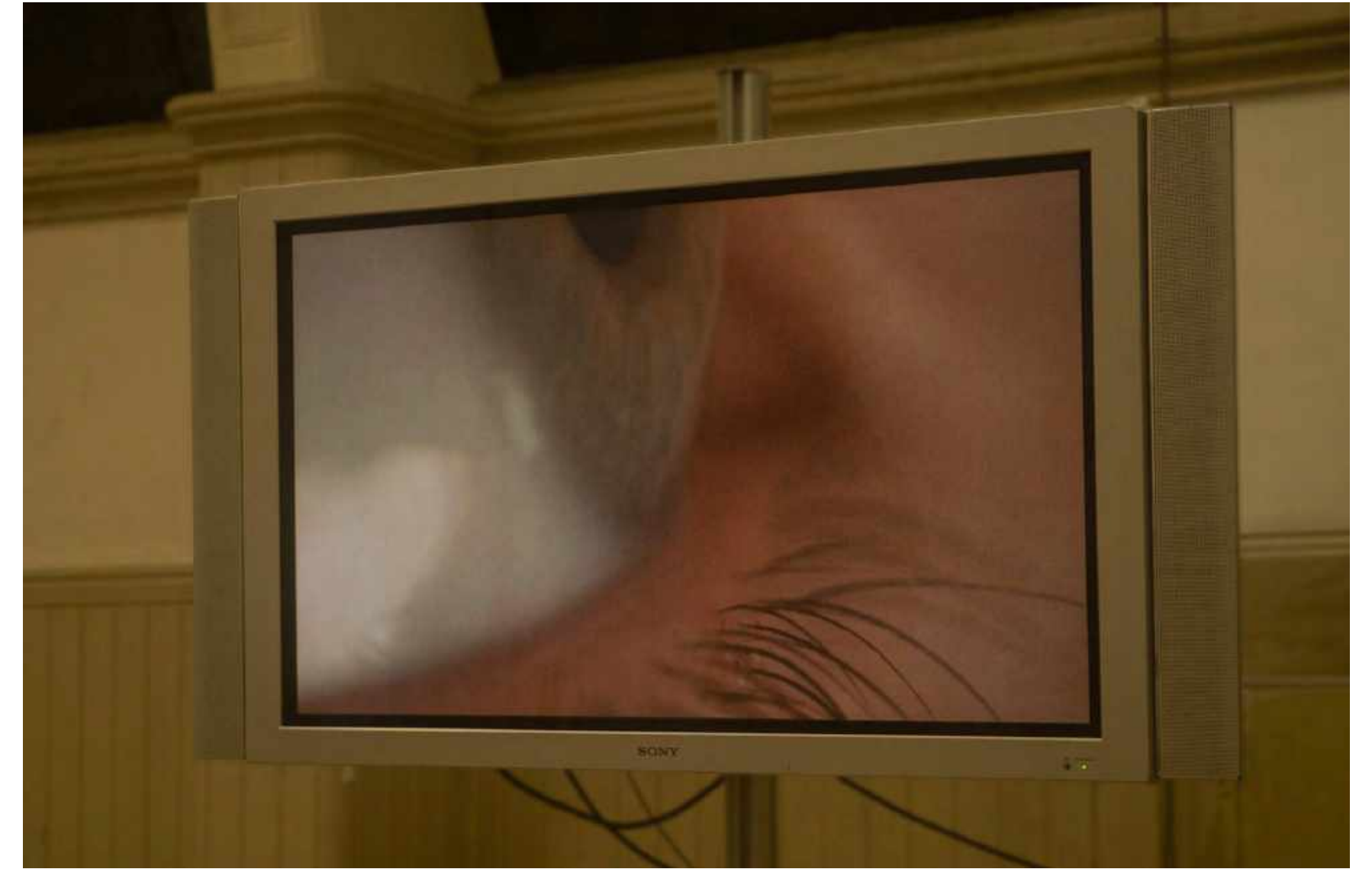


DSC_1146 2.00_01_48_01.Still051.jpg DSC_1146 2.00_01_48_09.Still052.jpg



Eye, 2021, 3 minutes 30 seconds, 1080p, 16:9
@ Night School Exhibiton

I made this film with a macro lens. After I have done so much research into how the eye worked, I started to film my eye, as I wanted to document the movement of the eye and to take a closer look at it. Using the macro lens, allowed me to see my eye like I had never seen it before.



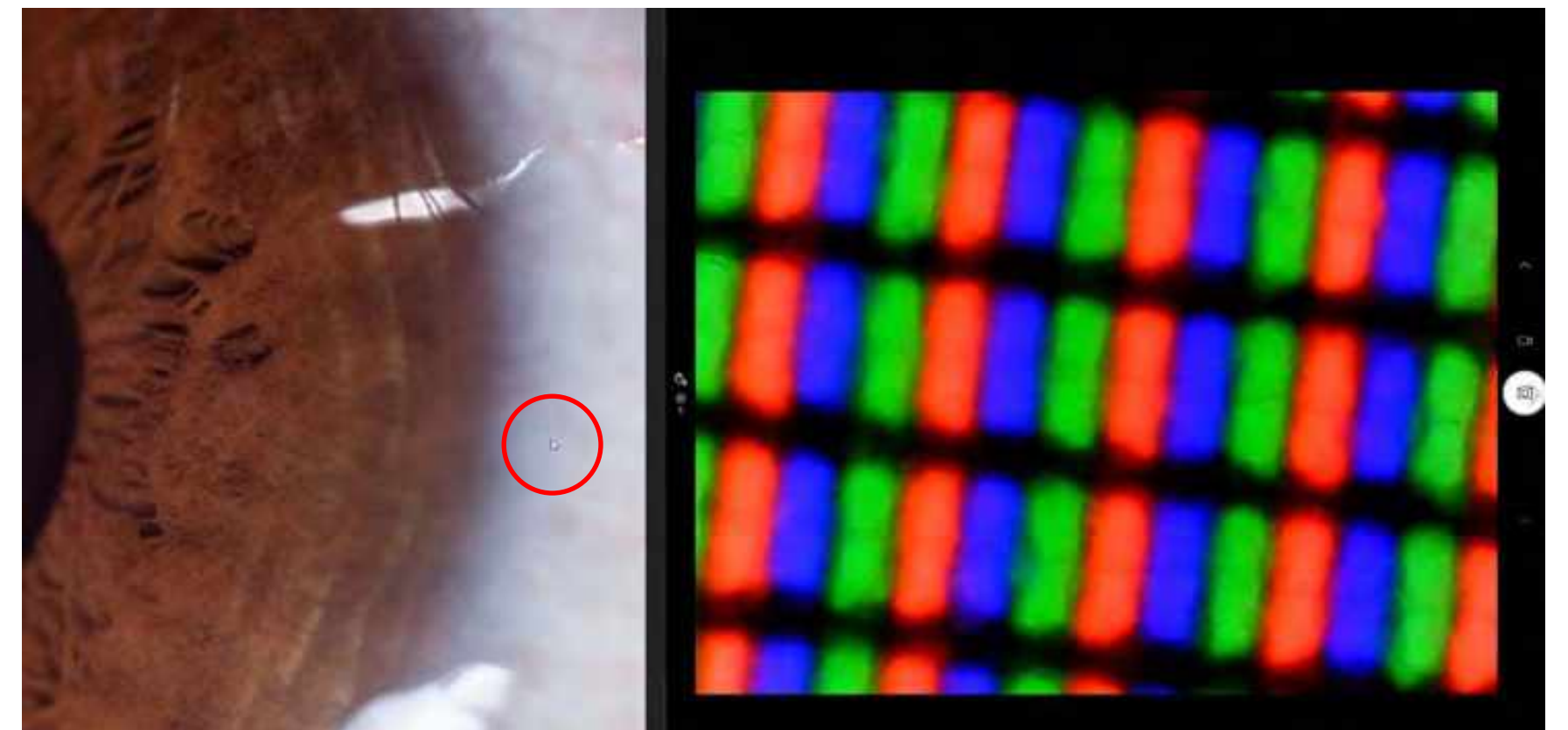
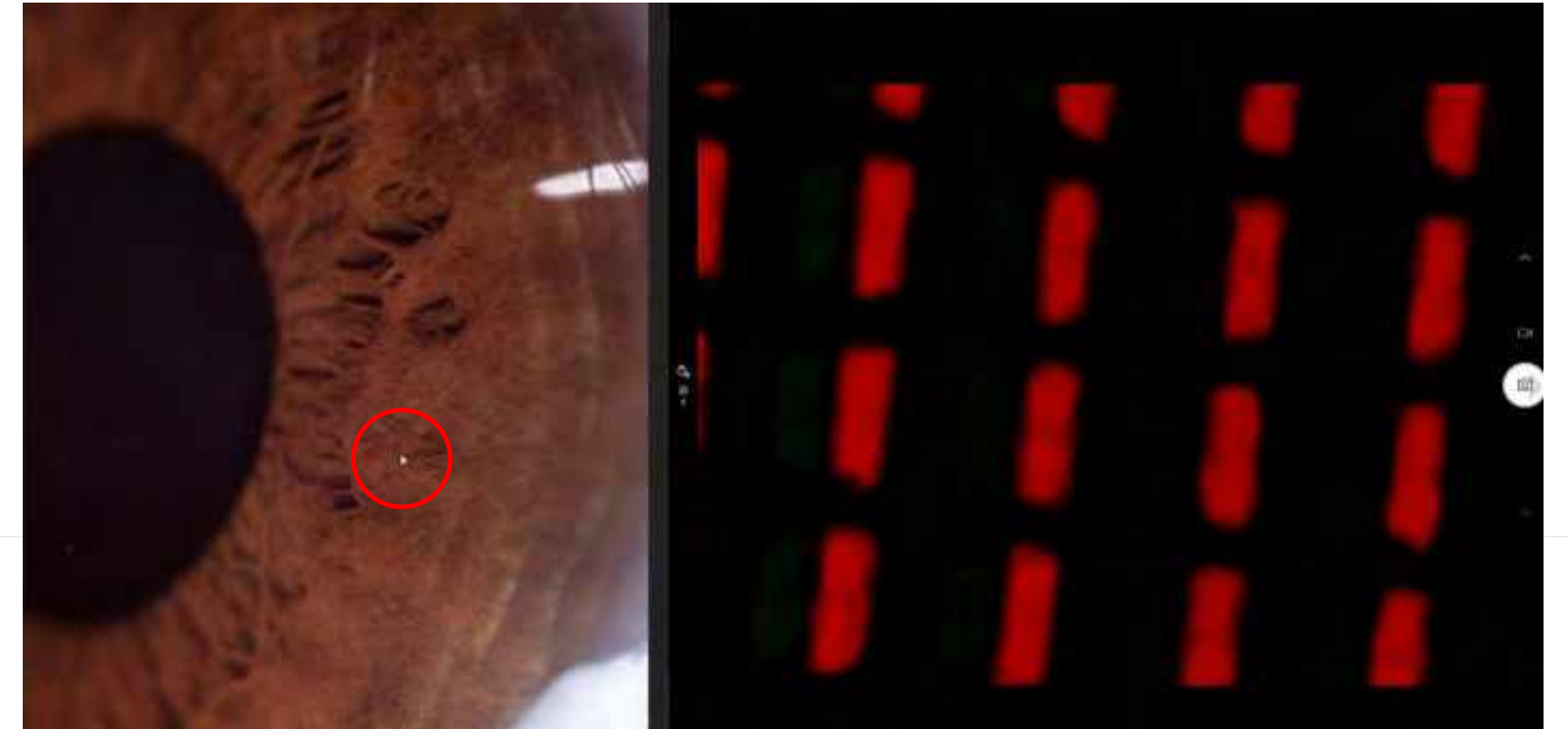
Eye, 2021, 3 minutes 30 seconds, 1080p, 16:9
@ Night School Exhibiton

Using the macro lens, I documented the movements of the eye. I created this film to give my viewers an insight into the eye as we don't take the time to look at our eyes enough to appreciate the complexity of them.

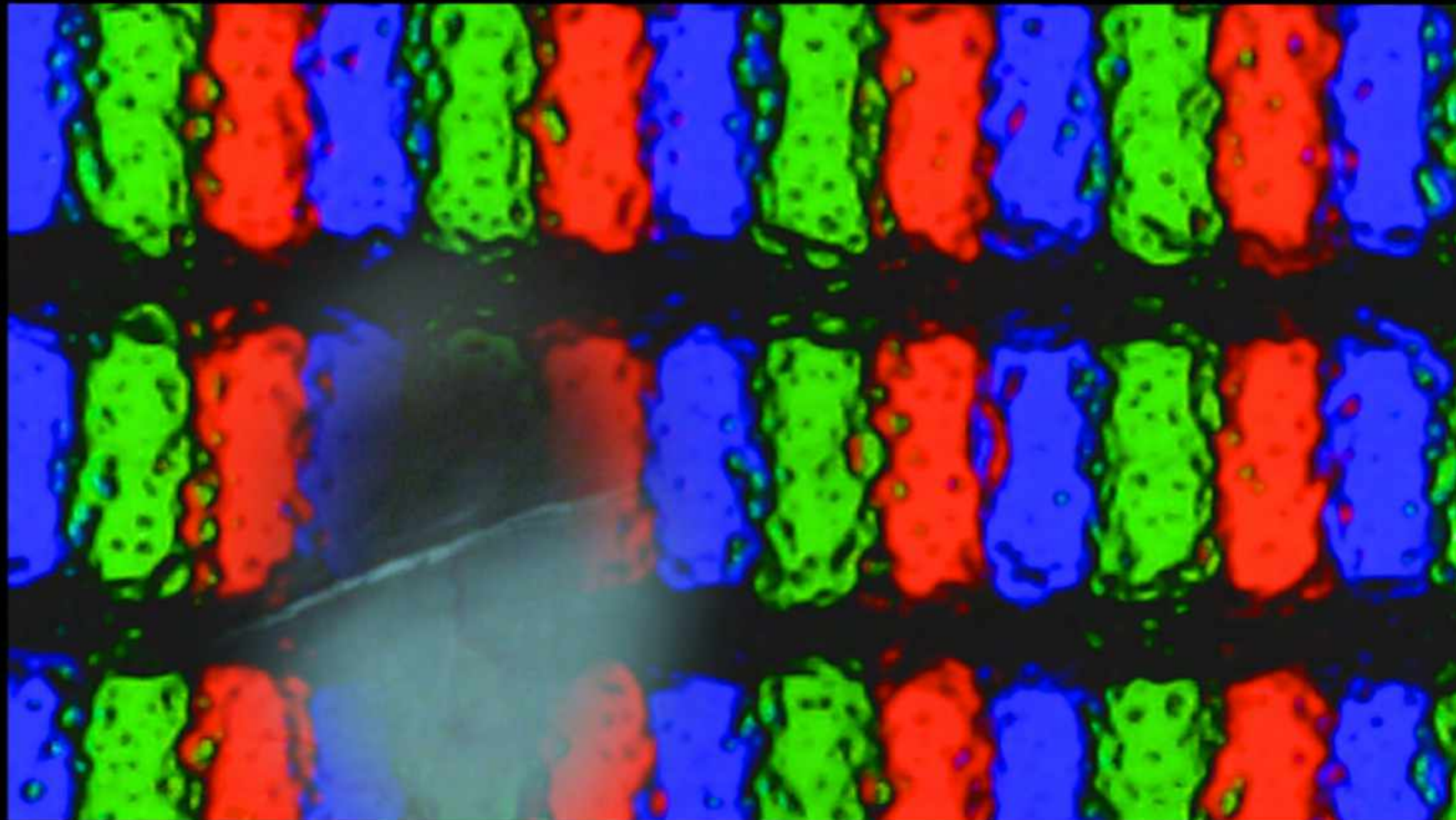
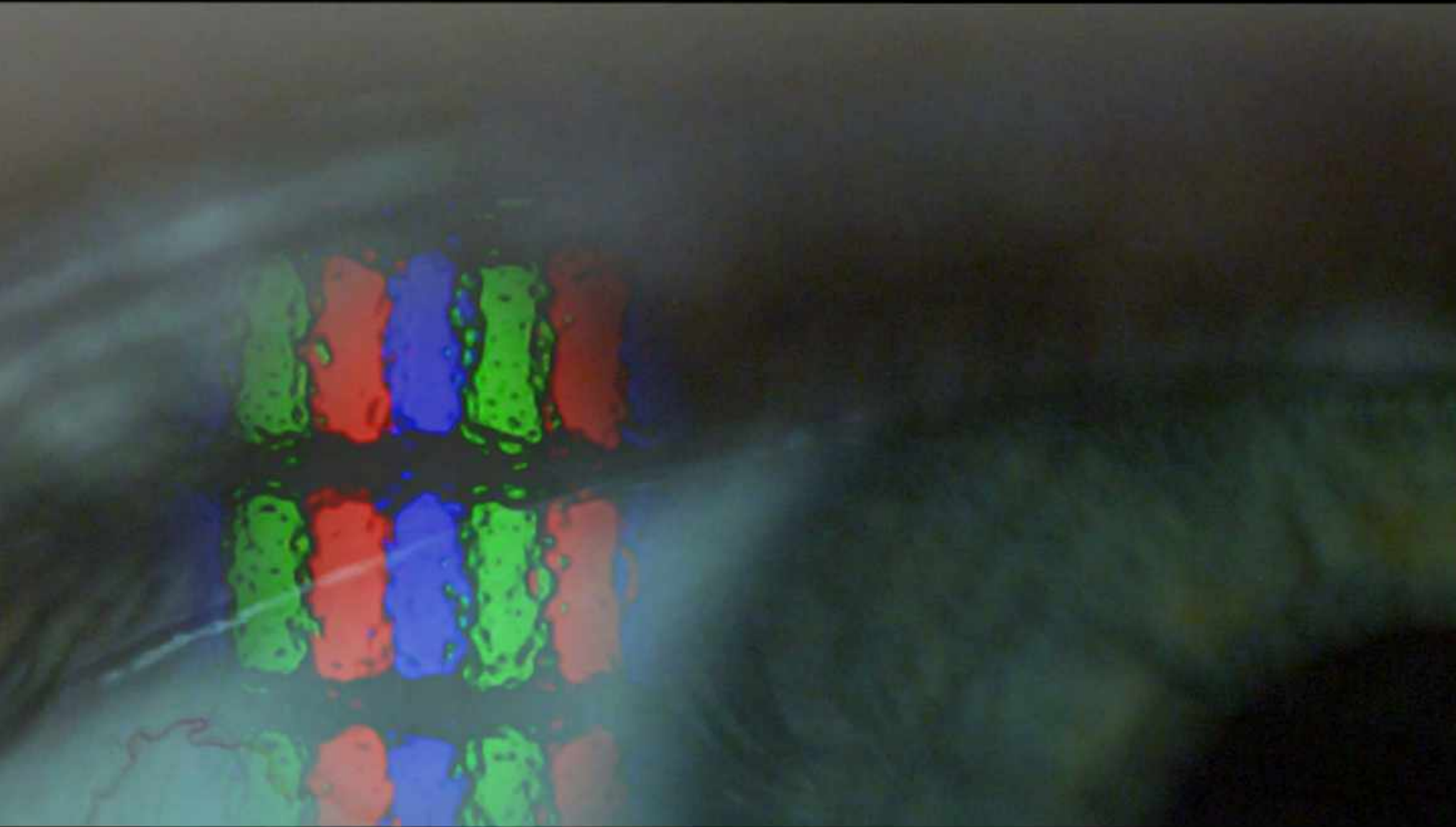


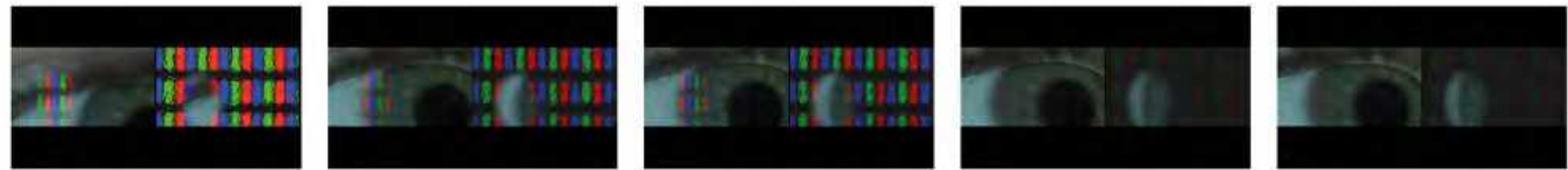
CNET, 2 minutes 17 second video.

Each pixel is made up of 3 colour filters, red, green and blue. These colours turn on and off in order to create the right mix to create the colour that needs to be displayed. As our eyes can see RGB, it is created so that the pixels are so small by the time the colour reaches our eyes we can just see the result not the individual pixels.



Experimenting with the macro lens on the screen and viewing the differences in the rgb pixels on different parts of the images. On a darker part of the image only the red pixels appear and on the white areas all of the red, green and blue pixels are on.





DSC_1146 2.00_00_00_00.Still027.jpg DSC_1146 2.00_00_00_17.Still028.jpg DSC_1146 2.00_00_00_19.Still029.jpg DSC_1146 2.00_00_01_00.Still030.jpg DSC_1146 2.00_00_01_06.Still031.jpg



DSC_1146 2.00_00_01_13.Still032.jpg DSC_1146 2.00_00_02_12.Still033.jpg DSC_1146 2.00_00_02_22.Still034.jpg DSC_1146 2.00_00_03_02.Still035.jpg DSC_1146 2.00_00_03_07.Still036.jpg



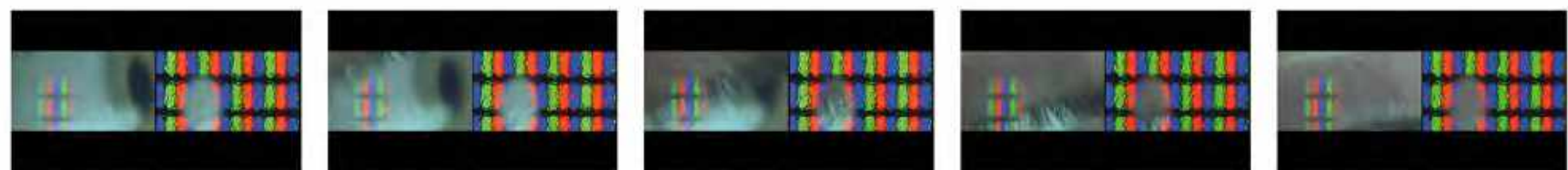
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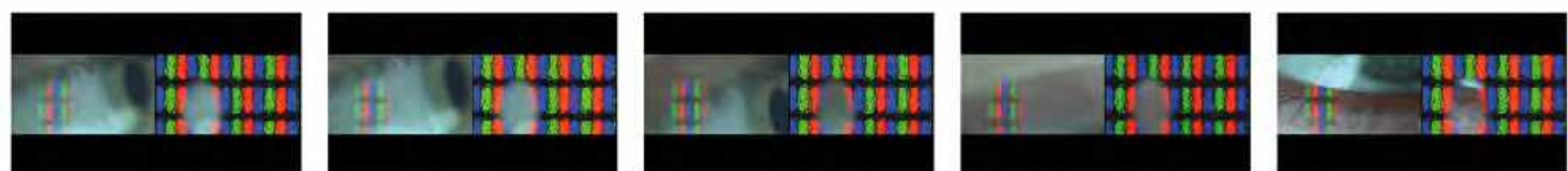
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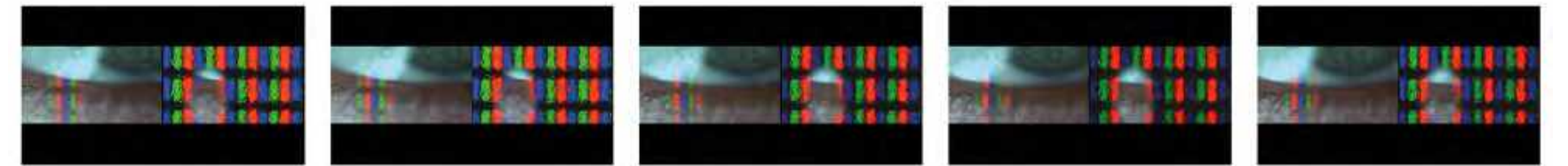
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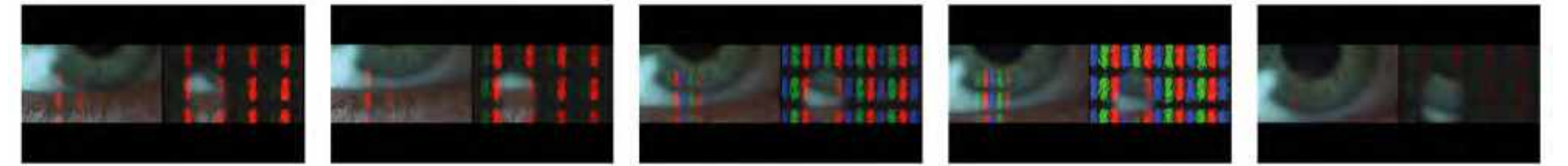
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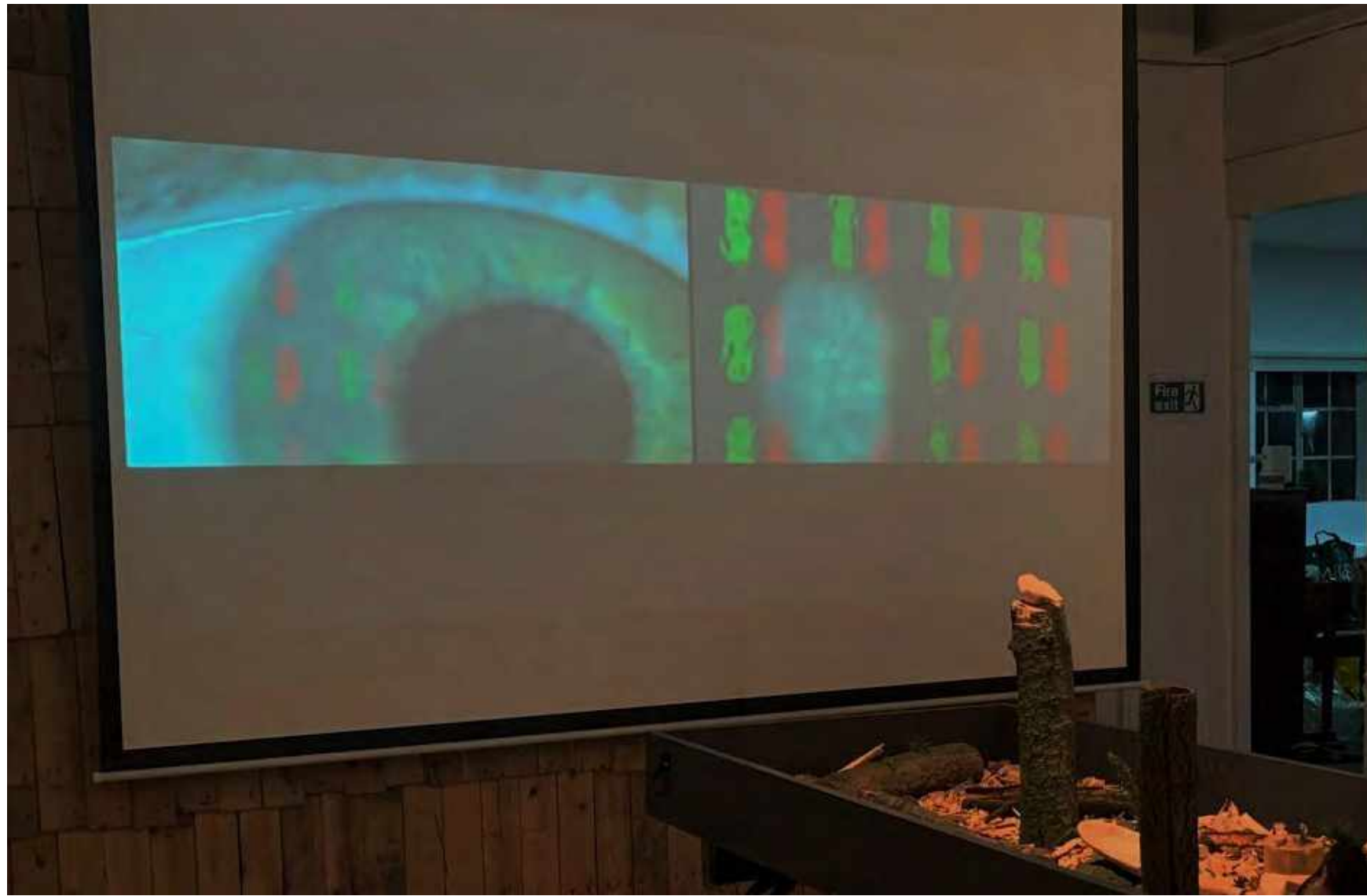
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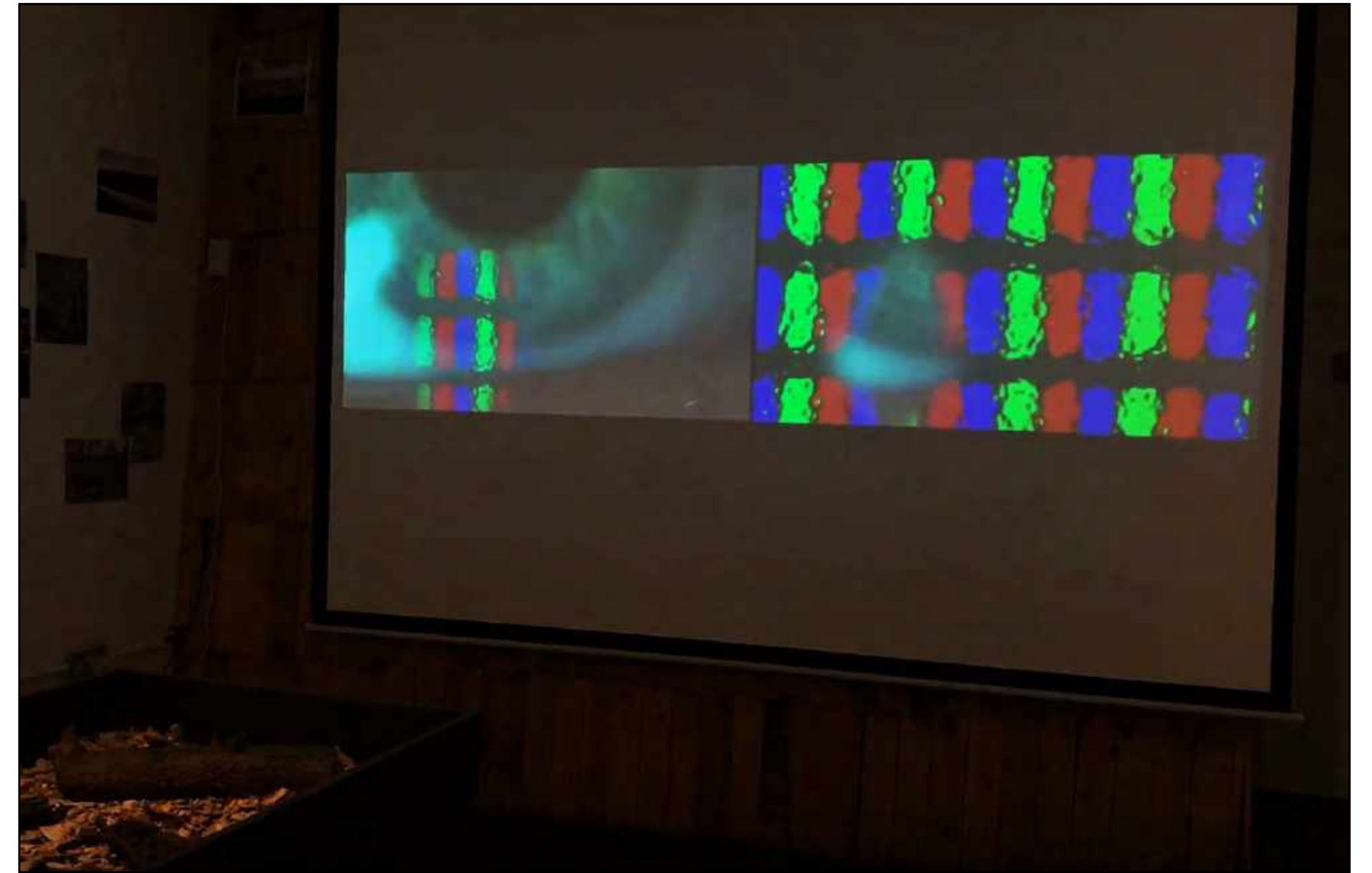
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DSC_1146 2.00_01_09_01.Still082.jpg



Work in progress, 2021, 3 minutes 30 seconds, 1080p, 16:9
@Centrala



Work in progress, 2021, 3 minutes 30 seconds, 1080p, 16:9
@Centrala





Crassula 1.jpg



Crassula.jpg



Cucumber 1.jpg



Cucumber 2.jpg



Cucumber 3.jpg



gladiolus 1.jpg



gladiolus 2.jpg



Kalanchoe 1.jpg



Kalanchoe.jpg



lilies 1.jpg



lilies 2.jpg



lilies 3.jpg



lilies 4.jpg



Lily1.jpg



lily2.jpg



lily3.jpg



lily4.jpg



lily5.jpg



lily6.jpg



lily7.jpg



roses dying 1.jpg



roses dying 2.jpg



Roses pink 1.jpg



Roses pink 2.jpg



Roses pink 3.jpg



Roses pink 4.jpg



Roses pink 5.jpg



Roses pink 6.jpg



Roses 1.jpg



Roses 2.jpg



Roses 3.jpg



Roses 4.jpg



Roses 5.jpg



Spider 1.jpg



Spider 2.jpg



Strawb1.jpg



Strawb2.jpg



Strawb3.jpg



Strawb4.jpg



Sunflower vase 1.jpg



Sunflower vase 2.jpg



Sunflower vase 3.jpg



Sunflower vase 4.jpg



Tulips1.jpg



Tulips2.jpg



vase flowers close.jpg



vase flowers1.jpg



vase flowers2.jpg

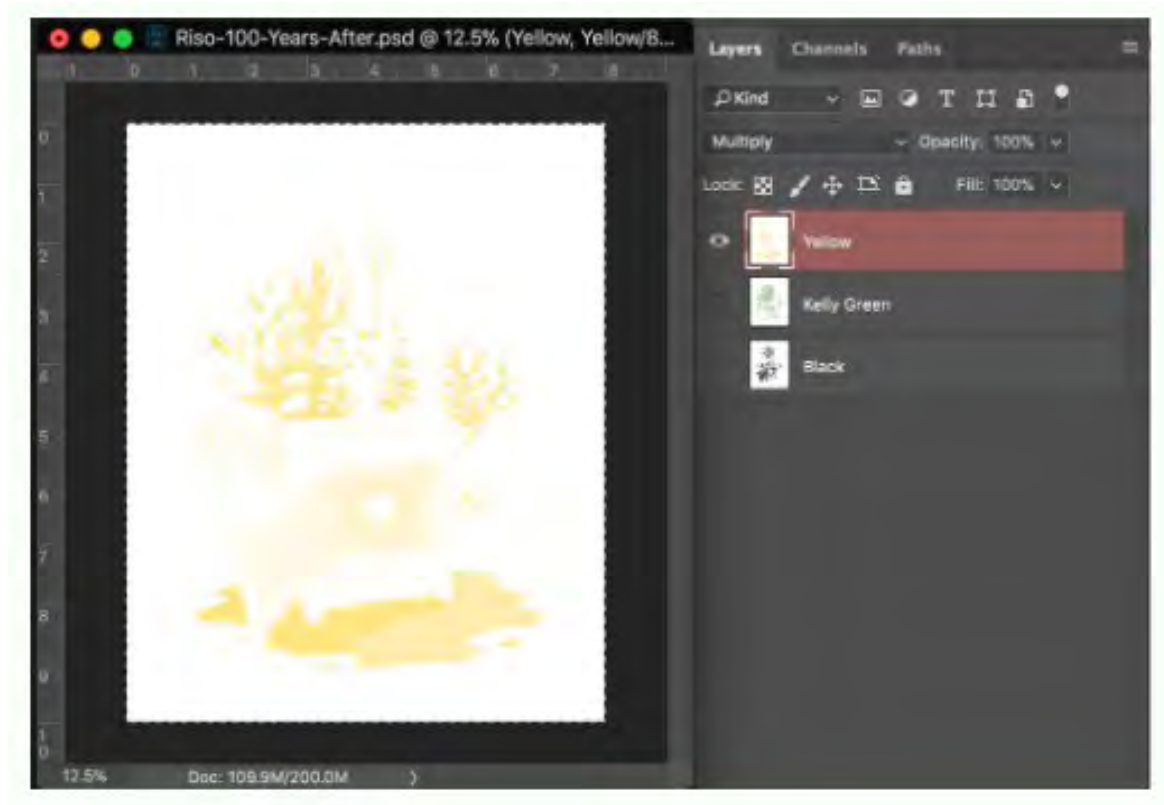


vase flowers3.jpg



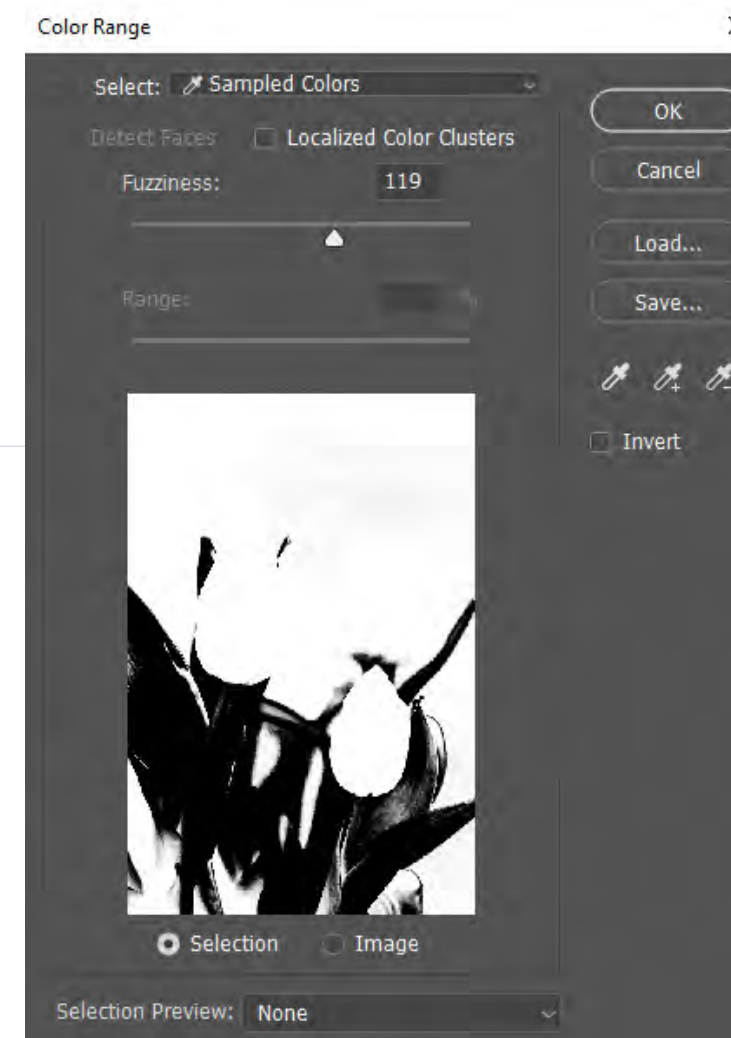
vase flowers4.jpg

After taking some time to step back and have a look at my project, I thought to take pictures and document the things around me, that my eyes see, instead of taking pictures of my eye. I started off with the macro lens as I had been using this throughout, to capture things that the eye couldn't normally see. However, I then decided to use a wider lens to get a better representation of what my own eyes could actually see.



Risolve Studio, Riso Printing

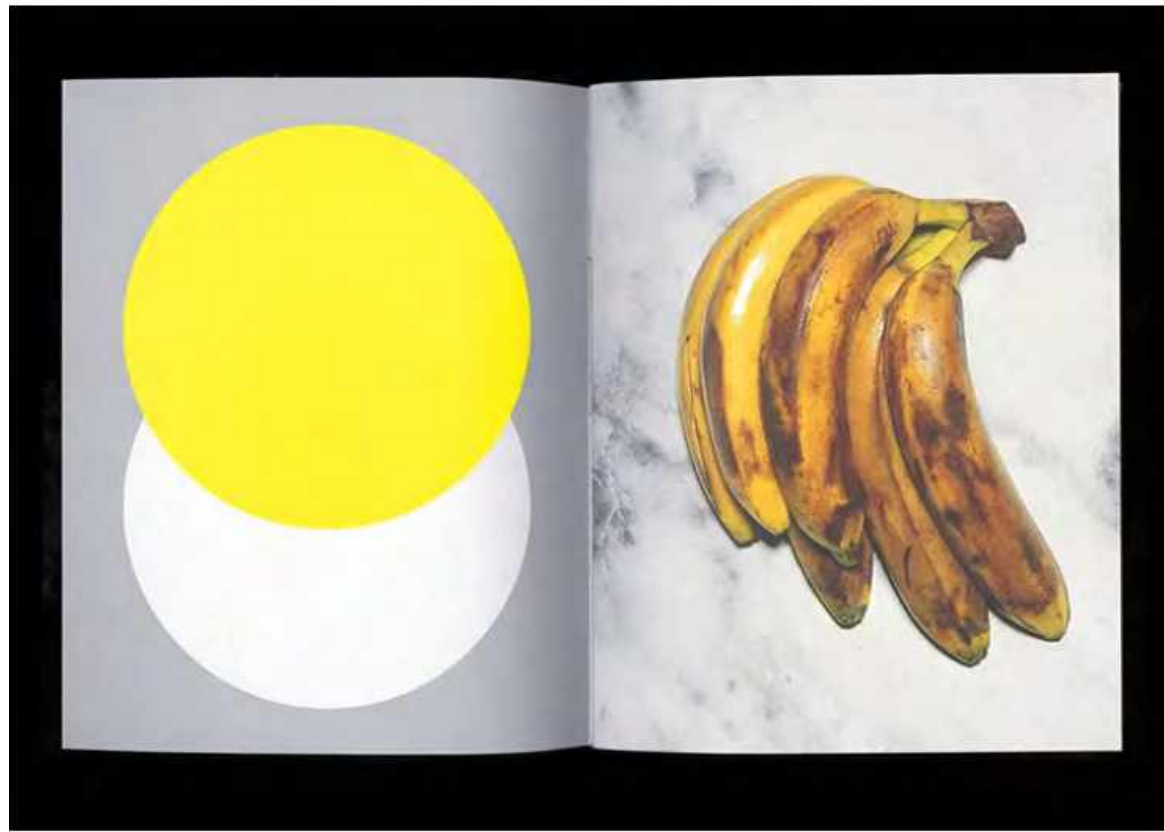
Using the same methods in Photoshop as you would for separating colours for printing, I went on to experiment with colour picking from my images.



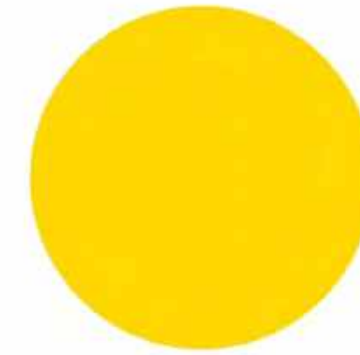
I began to experiment with colour picking in Photoshop, choosing one colour and allowing it to take over the image, making only the parts that were that colour, to pop.



This method made some interesting visuals, however I didn't feel that they helped with the development of my project.



Spektra, Publication, Kaj Lehmann



Colour picking my images in illustrator.



Designing my publication.

I started to look into the values of the RGB colours and what each colour, that I would pick, was made up of digitally. I did a calculation to work out the percentage of red, green and blue that there was in each colour taken from each image. I wanted to find a way to educate the viewer/reader about the colours in the images, to encourage the thought process of thinking about RGB when we see colour around us. Instead of just seeing pink I wanted the viewer to see a breakdown of the percentages of red, green and blue that make up this 'pink' colour.

Red 69%
Green 29%
Blue 2%

Red 38%
Green 57%
Blue 5%

Red 39%
Green 46%
Blue 15%

Red 39%
Green 41%
Blue 20%

Red 41%
Green 39%
Blue 20%

Red 39%
Green 39%
Blue 22%

Red 37%
Green 35%
Blue 28%

Red 39%
Green 39%
Blue 22%

Red 51%
Green 36%
Blue 13%

Red 62%
Green 29%
Blue 9%

Red 60%
Green 33%
Blue 7%

Red 49%
Green 33%
Blue 18%

Red 34%
Green 34%
Blue 32%

Red 35%
Green 34%
Blue 31%

Red 33%
Green 34%
Blue 33%



tulips2.jpeg

crassula.jpeg

sunflowervase3.jpeg

lily6.jpeg

kalanchoe.jpeg

strawb2.jpeg

lily4.jpeg

cucumber2.jpeg

tulips2.jpeg



255, 2022, 14 pages, 148 x 210 mm

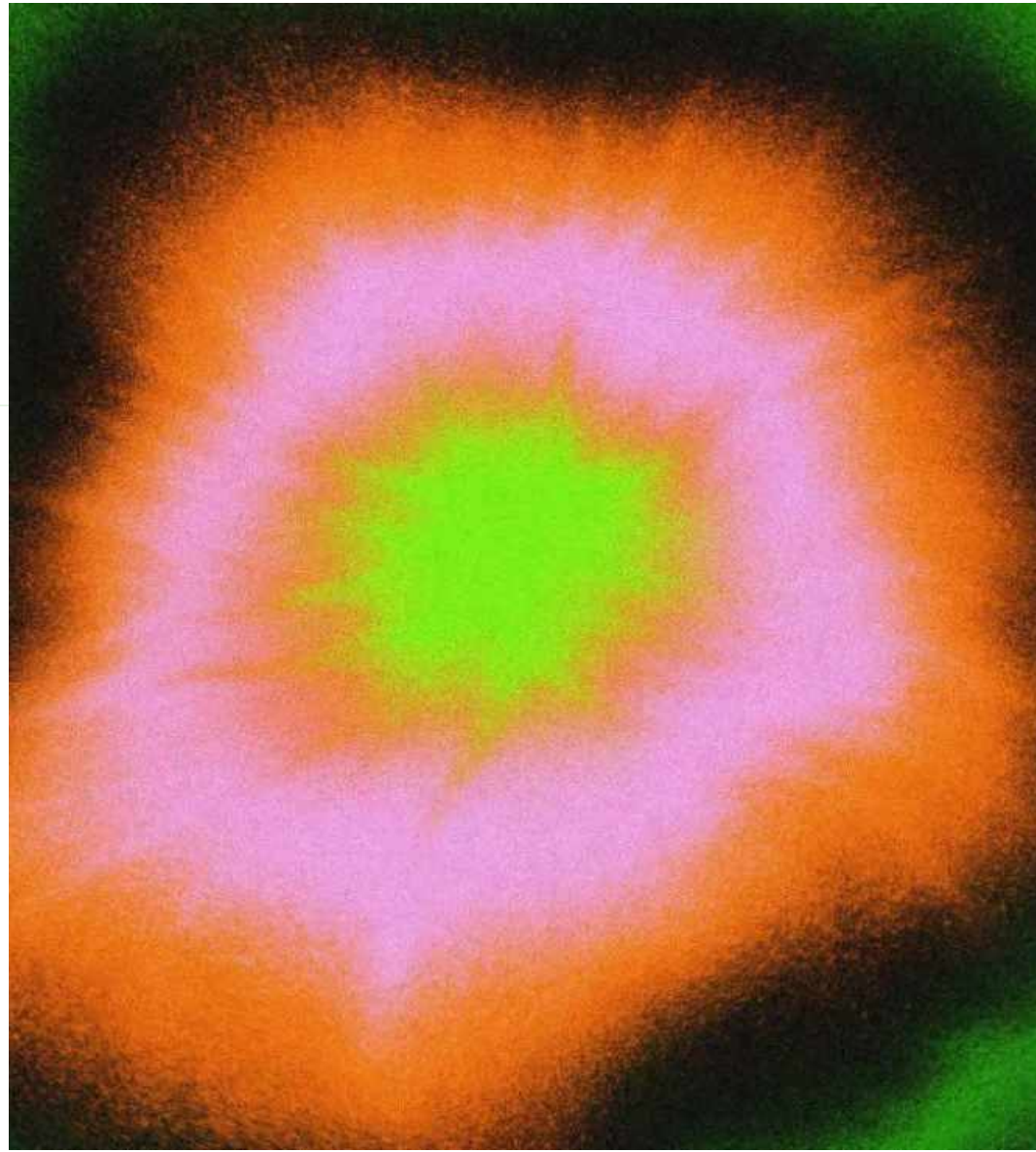


Scanned rose petals, 600 dpi



Rose Petal, 2022

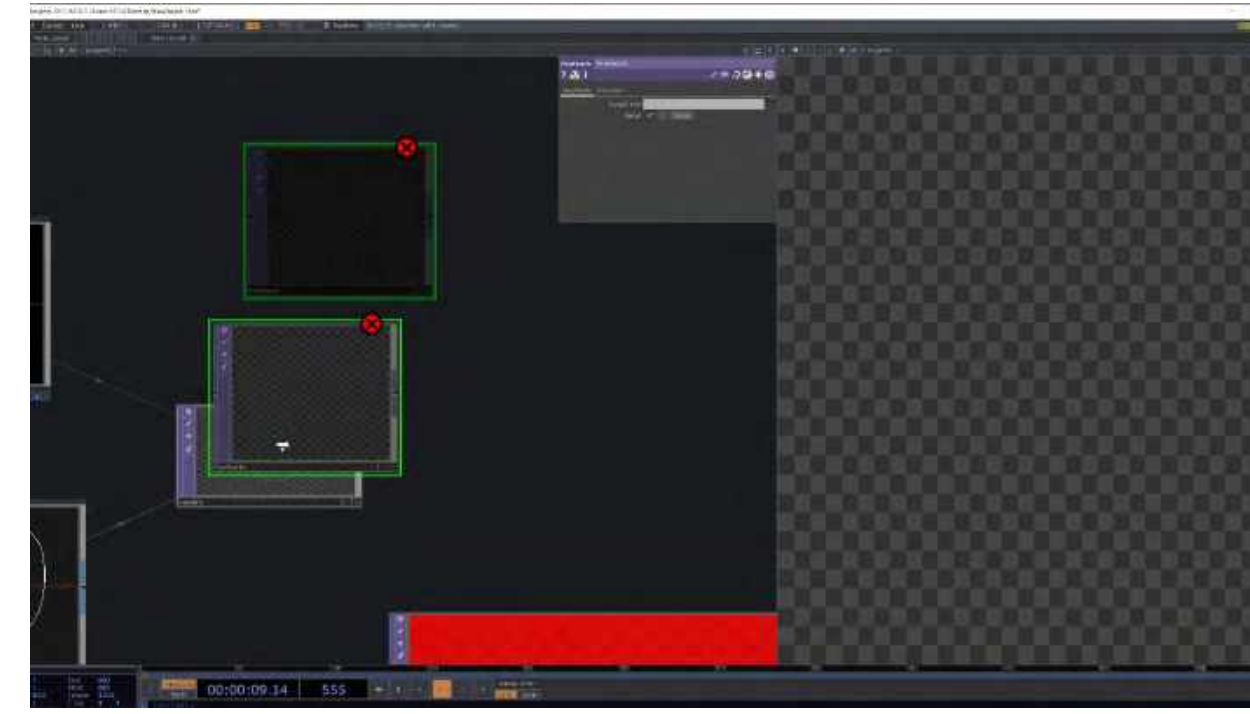




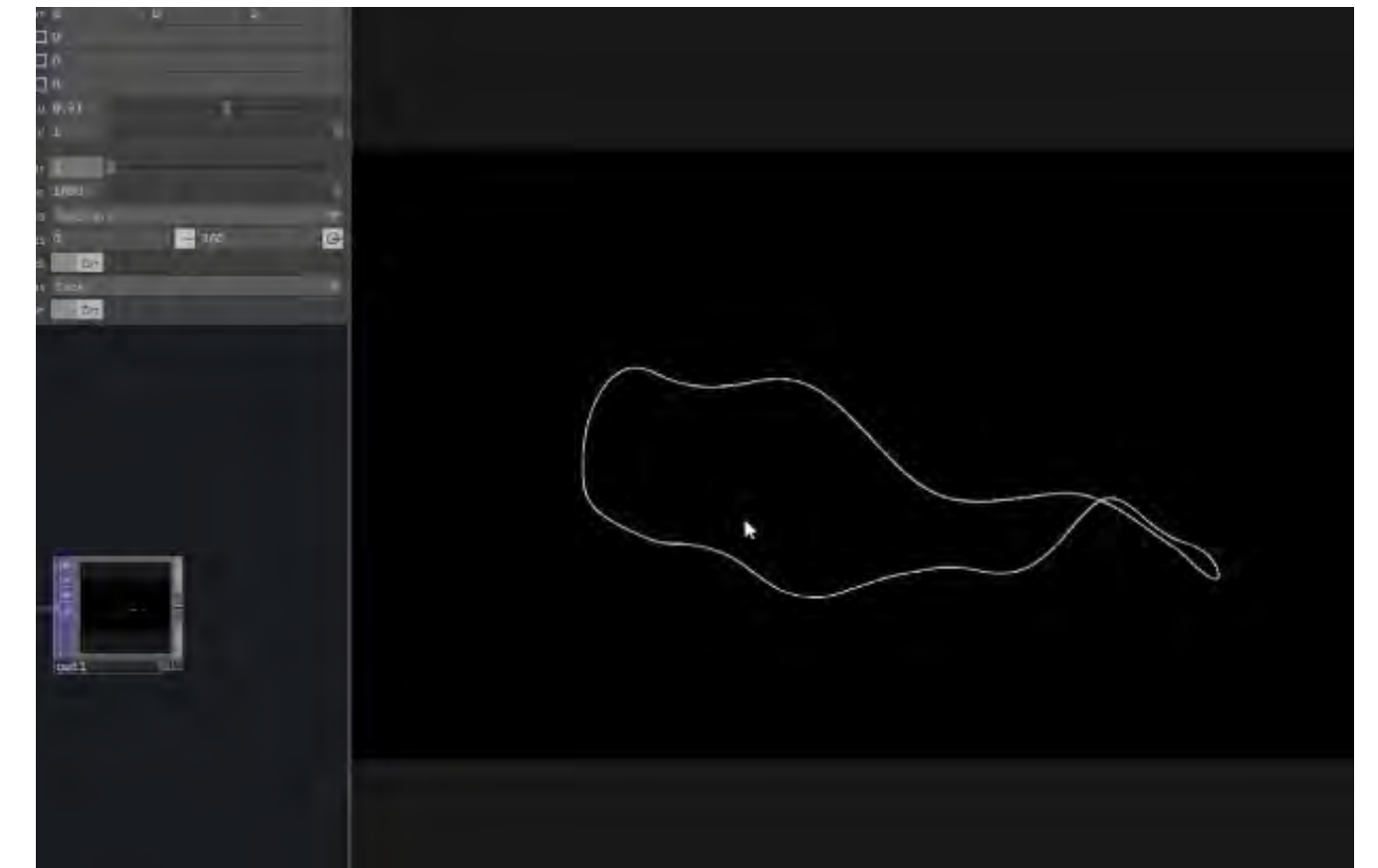
Melissa Santamaria, 2022

Inspired to start delving into her own creative pursuits, Melissa began playing around with a software called TouchDesigner – a tool that allows creatives to build interactive media systems, including music visuals and art. It wasn't long until Melissa became adept in her practice and started working with musicians to bring their tracks to life through warping, vibrant visuals. This includes artists such as Flying Lotus, Nubya Garcia, Hiatus Kaiyote, Actress, Ty Segall and TR/ST.

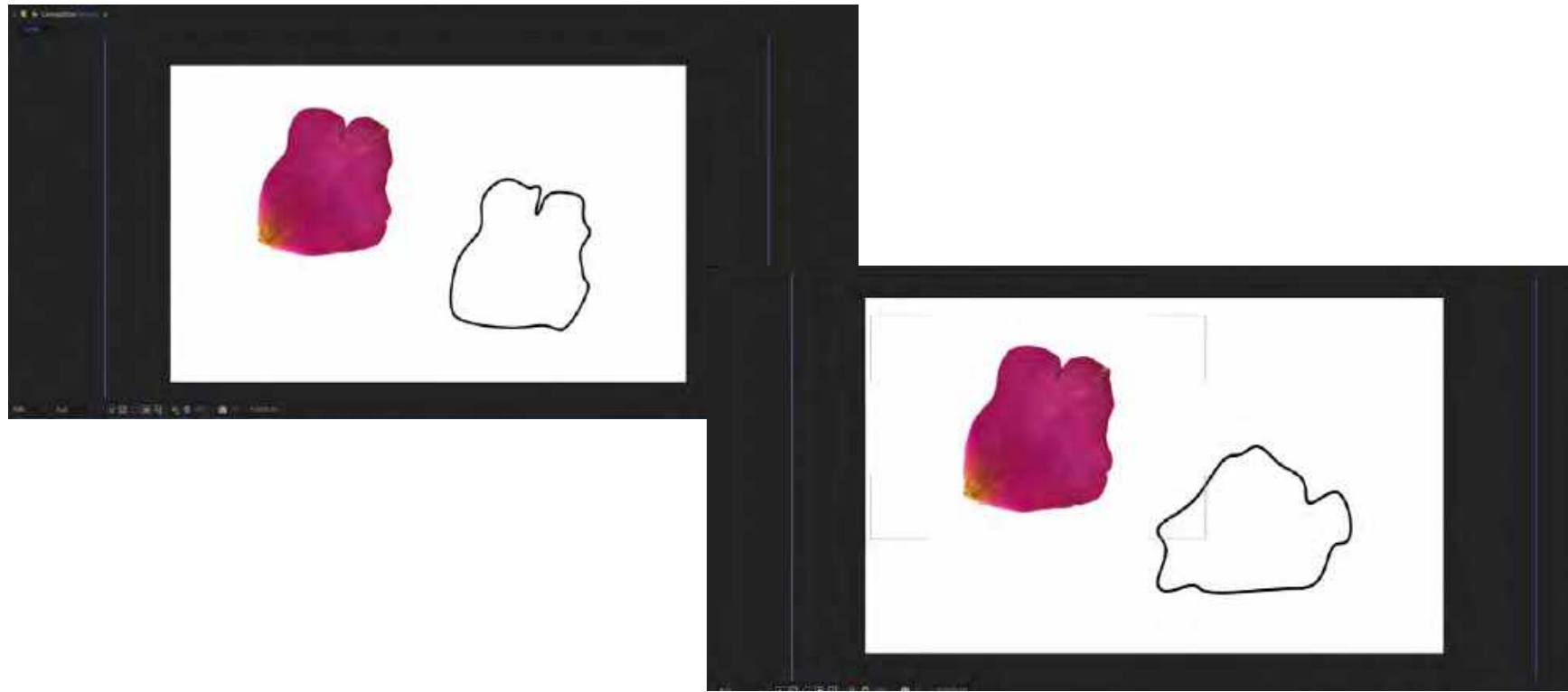
It's Nice That, February 2022



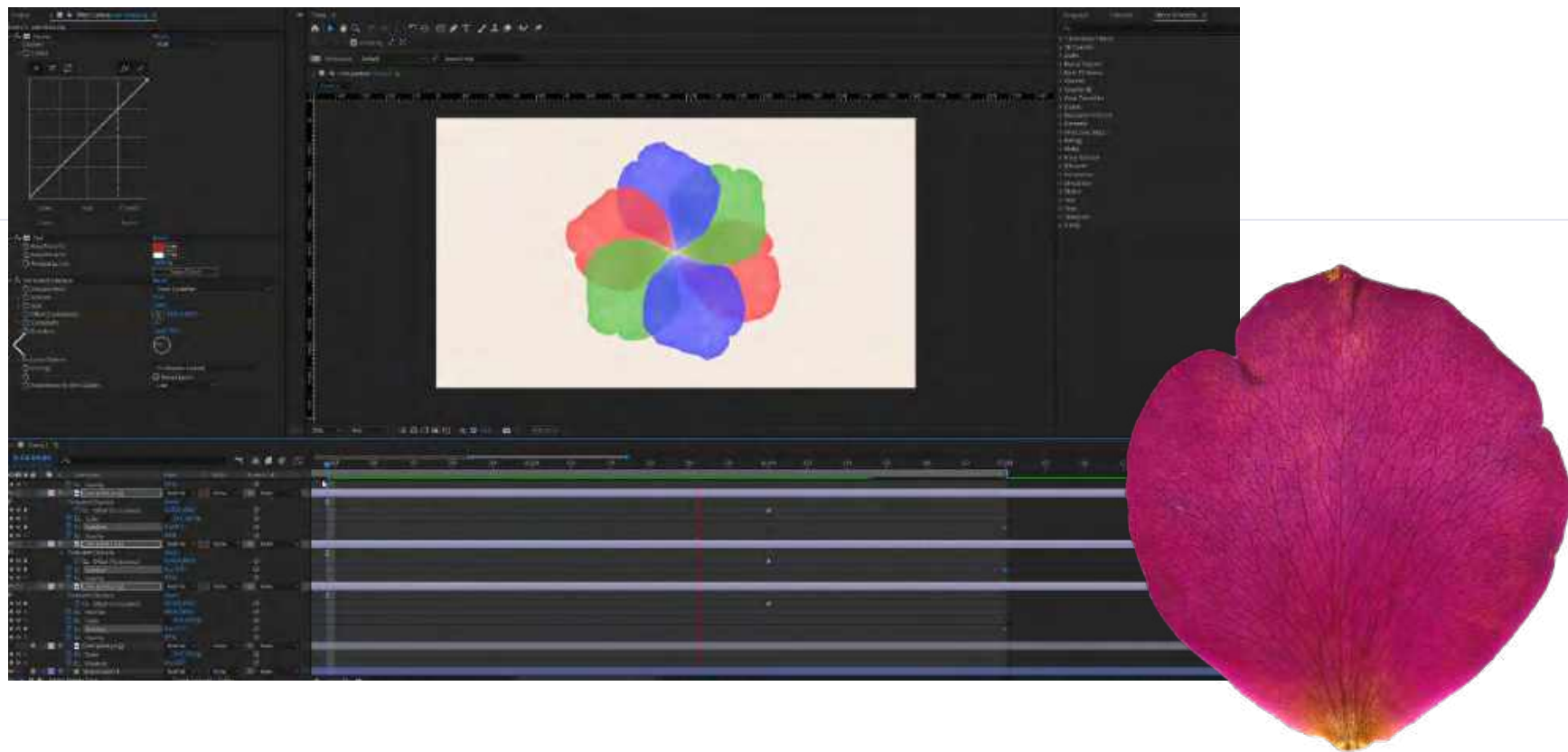
Using TouchDesigner



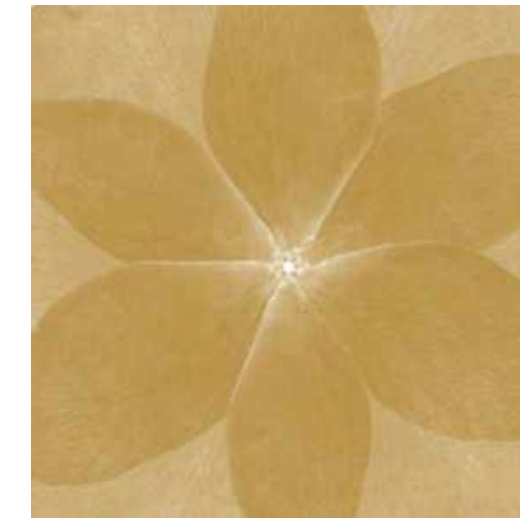
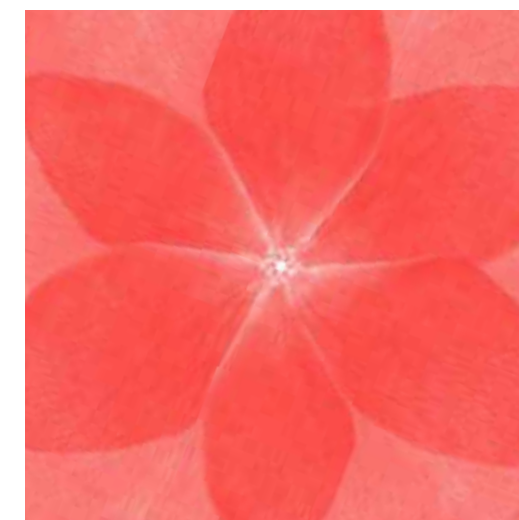
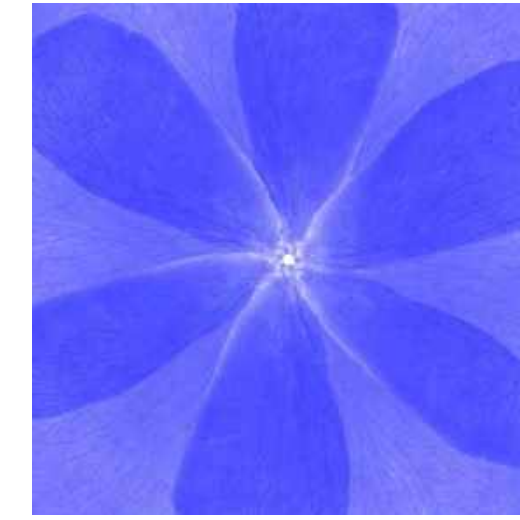
I attempted to use Touch Designer as this is the software that Melissa Santamaria uses to create her colourful visuals. I wanted to recreate the petals with randomised movement to see what the outcome would be, however it was quite complicated to get a result I was happy with. I did like the random abstract looks it gave to the shapes though.

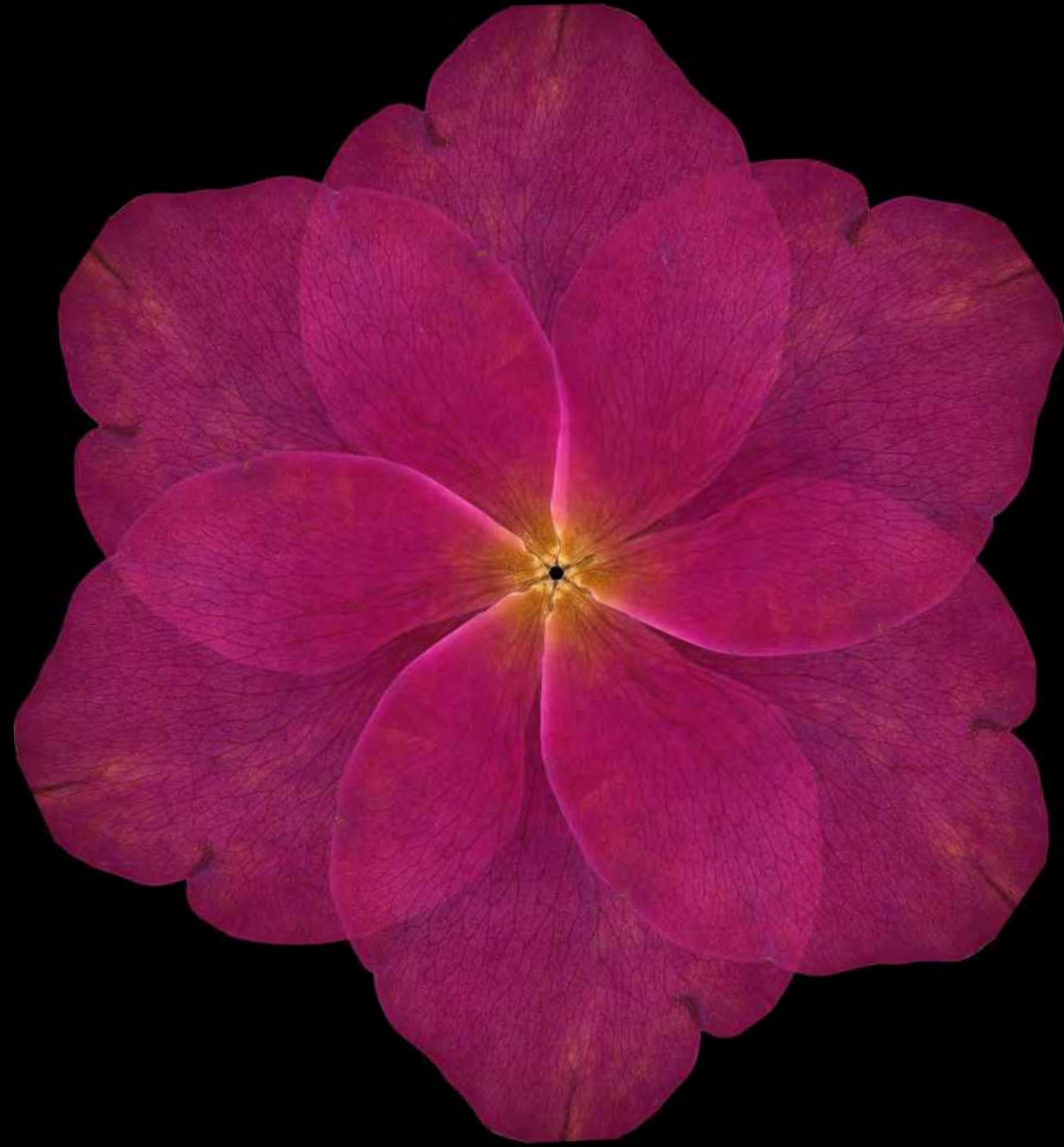


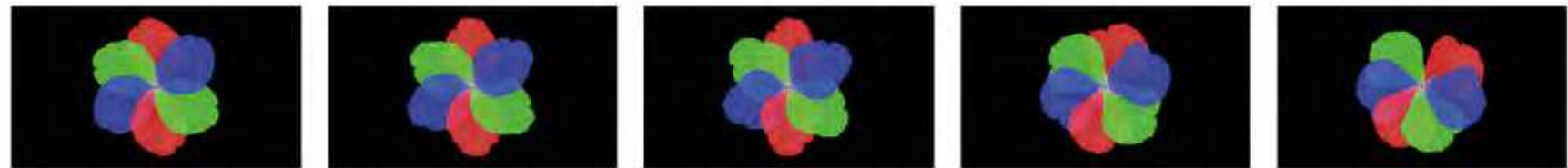
Using my new skills in after effects I aimed to achieve the abstract look that was in Touch Designer but with more control. I knew what I wanted to achieve, and animating it in a software I knew would allow for better results. Although it is more controlled, there are many effects in After effects that allow for the same sort of randomised calculations, so I began applying these to a simple distorted shape of the petal (only there for reference).



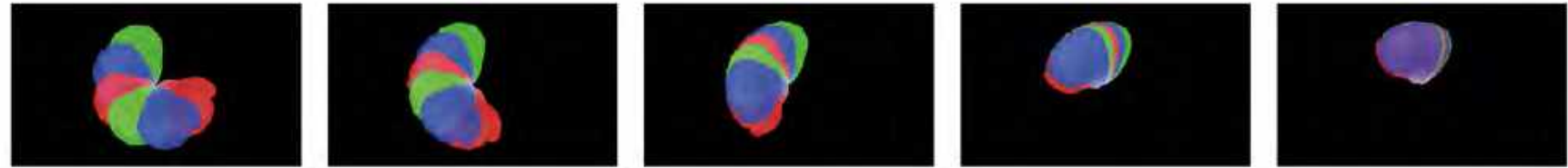
I then experimented with making the petals into a flower shape and using them to represent the values and percentages that I had learnt how to find, from the original colour of the petal. As I had already experimented with the movement of the petals, and its movement as a whole, I decided to make it spin. This allowed for me to gain a professional look with interesting and clean transitions between colours. I set for it to switch between red green and blue and doing so, it also included the colours in-between these shades which just goes to demonstrate the vast combinations of colours that just red, green and blue can make (all colours).







Petals final.00_00_04_06.Still001.jpg Petals final.00_00_05_28.Still002.jpg Petals final.00_00_07_29.Still003.jpg Petals final.00_00_13_16.Still004.jpg Petals final.00_00_14_02.Still005.jpg



Petals final.00_00_14_20.Still006.jpg Petals final.00_00_15_05.Still007.jpg Petals final.00_00_15_19.Still008.jpg Petals final.00_00_16_07.Still009.jpg Petals final.00_00_16_20.Still010.jpg



Petals final.00_00_17_08.Still011.jpg Petals final.00_00_17_27.Still012.jpg Petals final.00_00_18_10.Still013.jpg Petals final.00_00_18_20.Still014.jpg Petals final.00_00_19_05.Still015.jpg



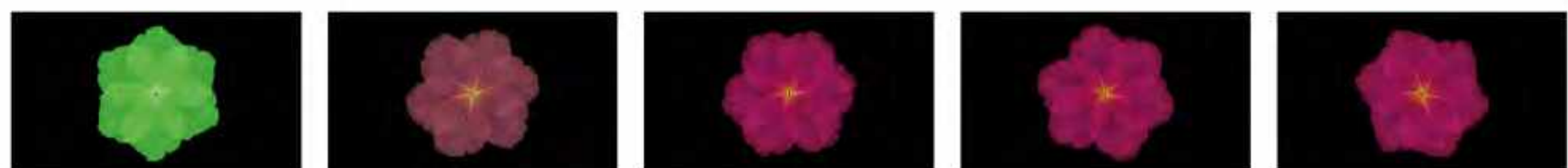
Petals final.00_00_19_25.Still016.jpg Petals final.00_00_20_14.Still017.jpg Petals final.00_00_21_12.Still018.jpg Petals final.00_00_23_17.Still019.jpg Petals final.00_00_24_23.Still020.jpg



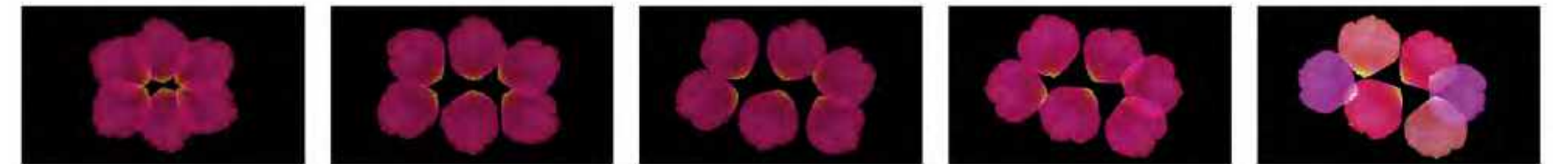
Petals final.00_00_25_18.Still021.jpg Petals final.00_00_26_16.Still022.jpg Petals final.00_00_28_05.Still023.jpg Petals final.00_00_30_11.Still024.jpg Petals final.00_00_31_27.Still025.jpg



Petals final.00_00_33_27.Still026.jpg Petals final.00_00_34_29.Still027.jpg Petals final.00_00_36_09.Still028.jpg Petals final.00_00_38_17.Still029.jpg Petals final.00_00_40_03.Still030.jpg



Petals final.00_00_42_05.Still031.jpg Petals final.00_00_44_26.Still032.jpg Petals final.00_00_46_07.Still033.jpg Petals final.00_00_48_28.Still034.jpg Petals final.00_00_56_02.Still035.jpg



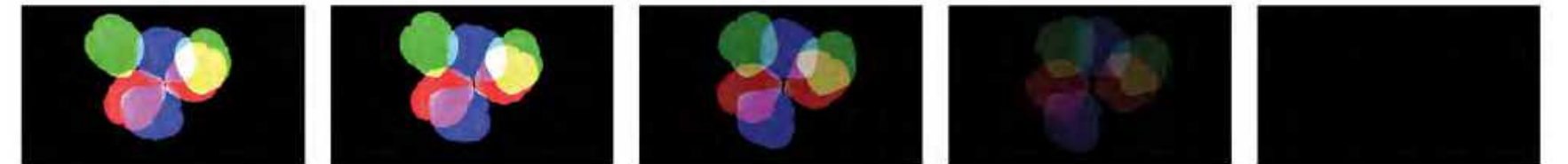
Petals final.00_00_57_17.Still036.jpg Petals final.00_00_58_16.Still037.jpg Petals final.00_01_00_21.Still038.jpg Petals final.00_01_02_15.Still039.jpg Petals final.00_01_04_06.Still040.jpg



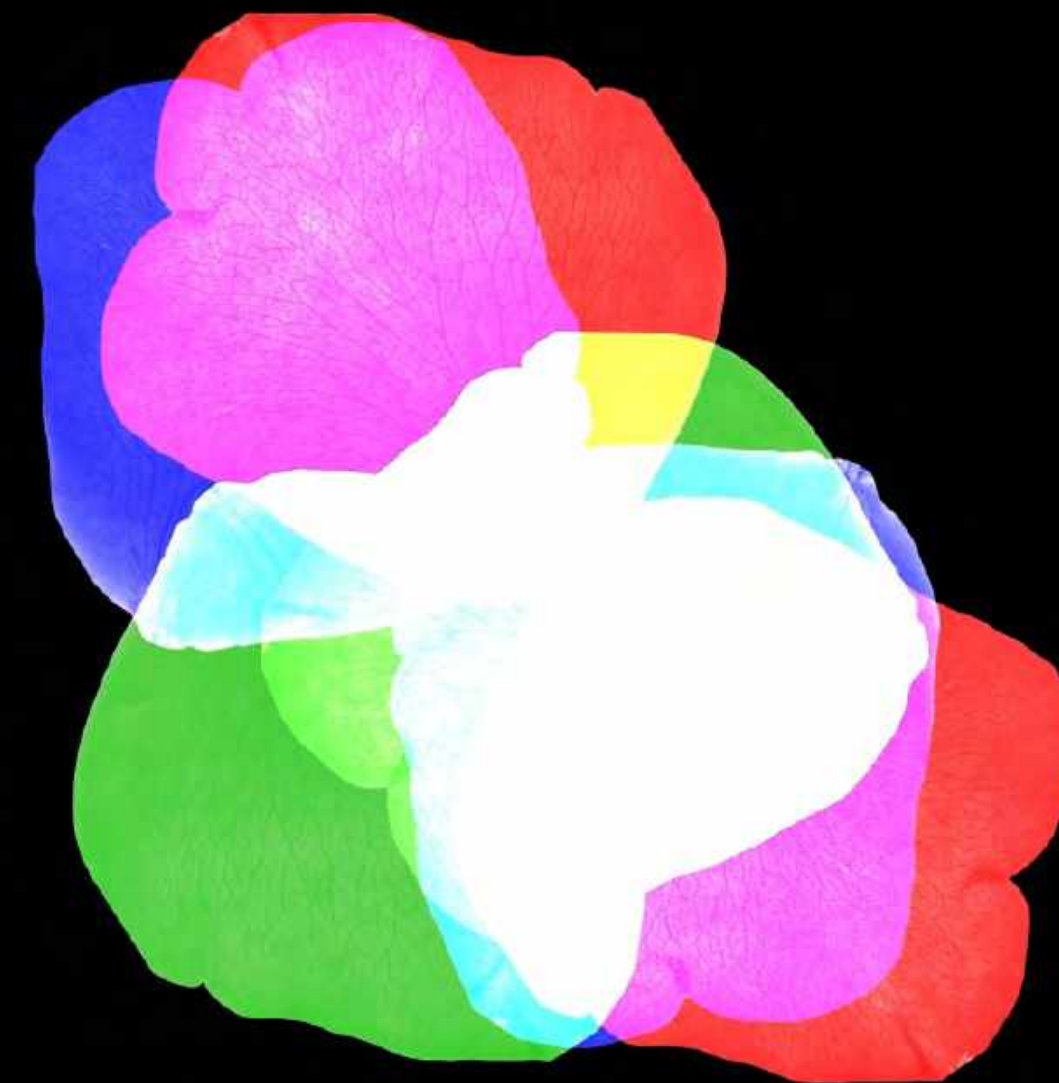
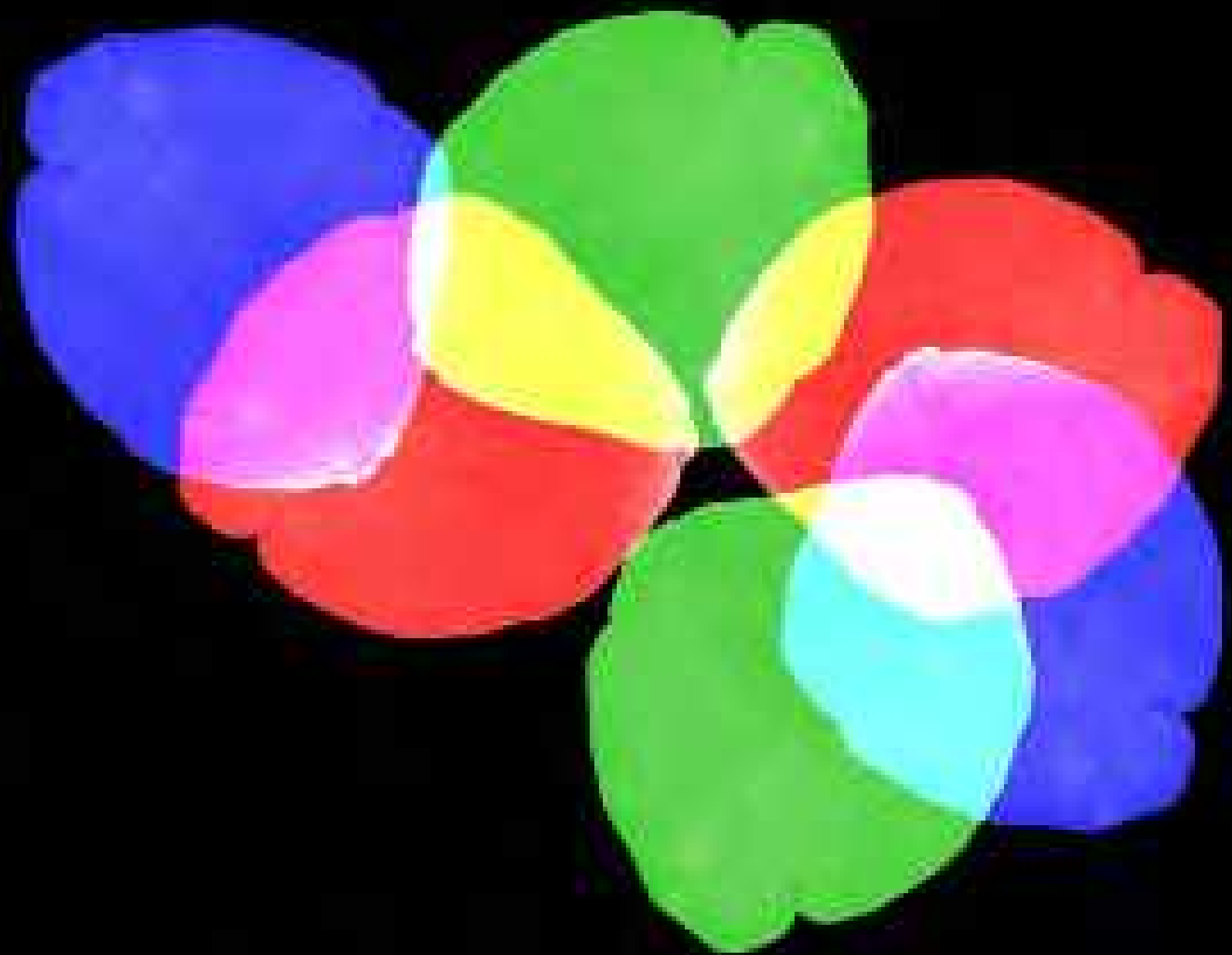
Petals final.00_01_05_08.Still041.jpg Petals final.00_01_06_28.Still042.jpg Petals final.00_01_08_15.Still043.jpg Petals final.00_01_10_14.Still044.jpg Petals final.00_01_12_19.Still045.jpg



Petals final.00_01_14_18.Still046.jpg Petals final.00_01_16_22.Still047.jpg Petals final.00_01_19_15.Still048.jpg Petals final.00_01_22_11.Still049.jpg Petals final.00_01_24_26.Still050.jpg

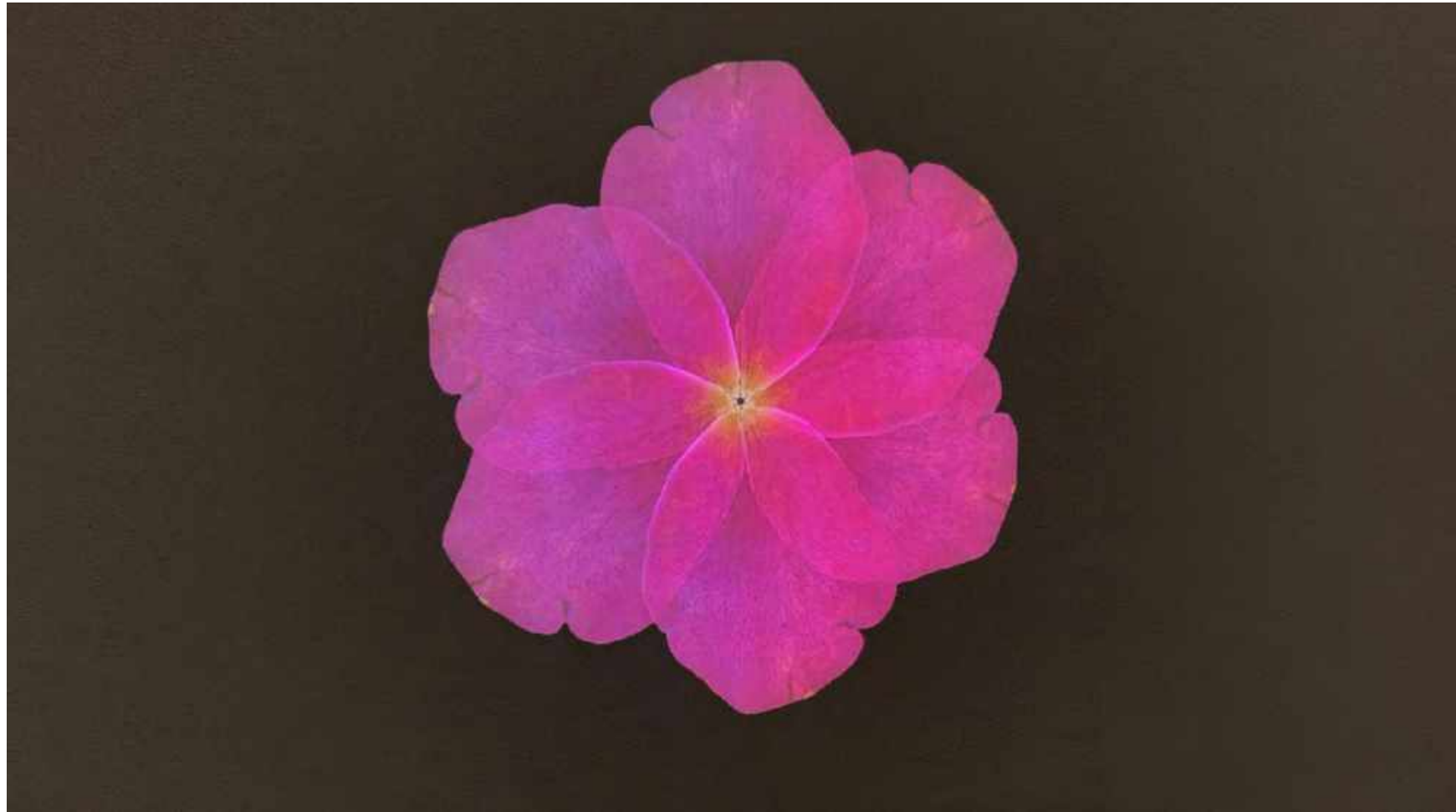


Petals final.00_01_26_29.Still051.jpg Petals final.00_01_27_17.Still052.jpg Petals final.00_01_28_21.Still053.jpg Petals final.00_01_29_18.Still054.jpg Petals final.00_01_30_10.Still055.jpg

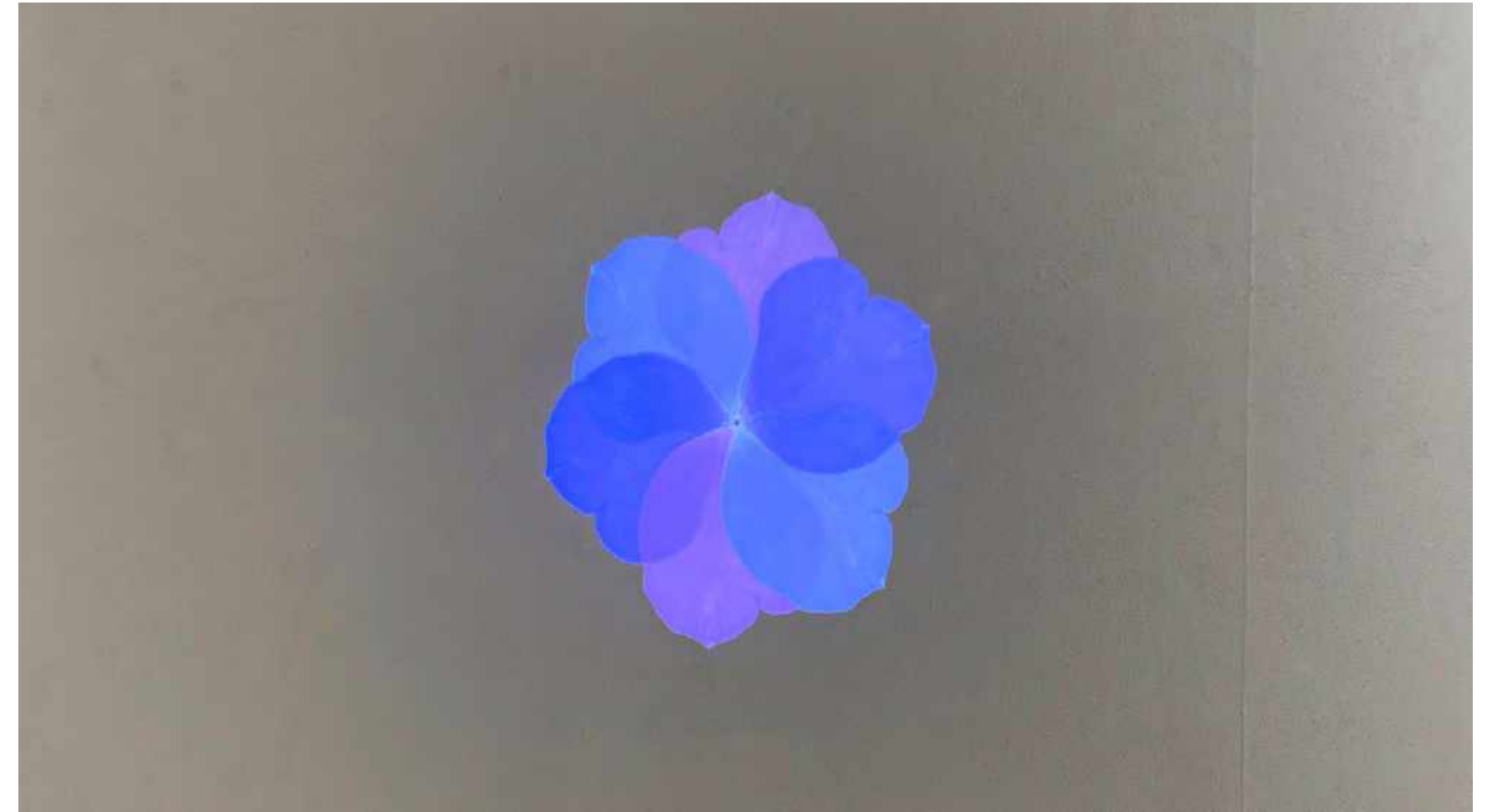


Colour wheel, 2022

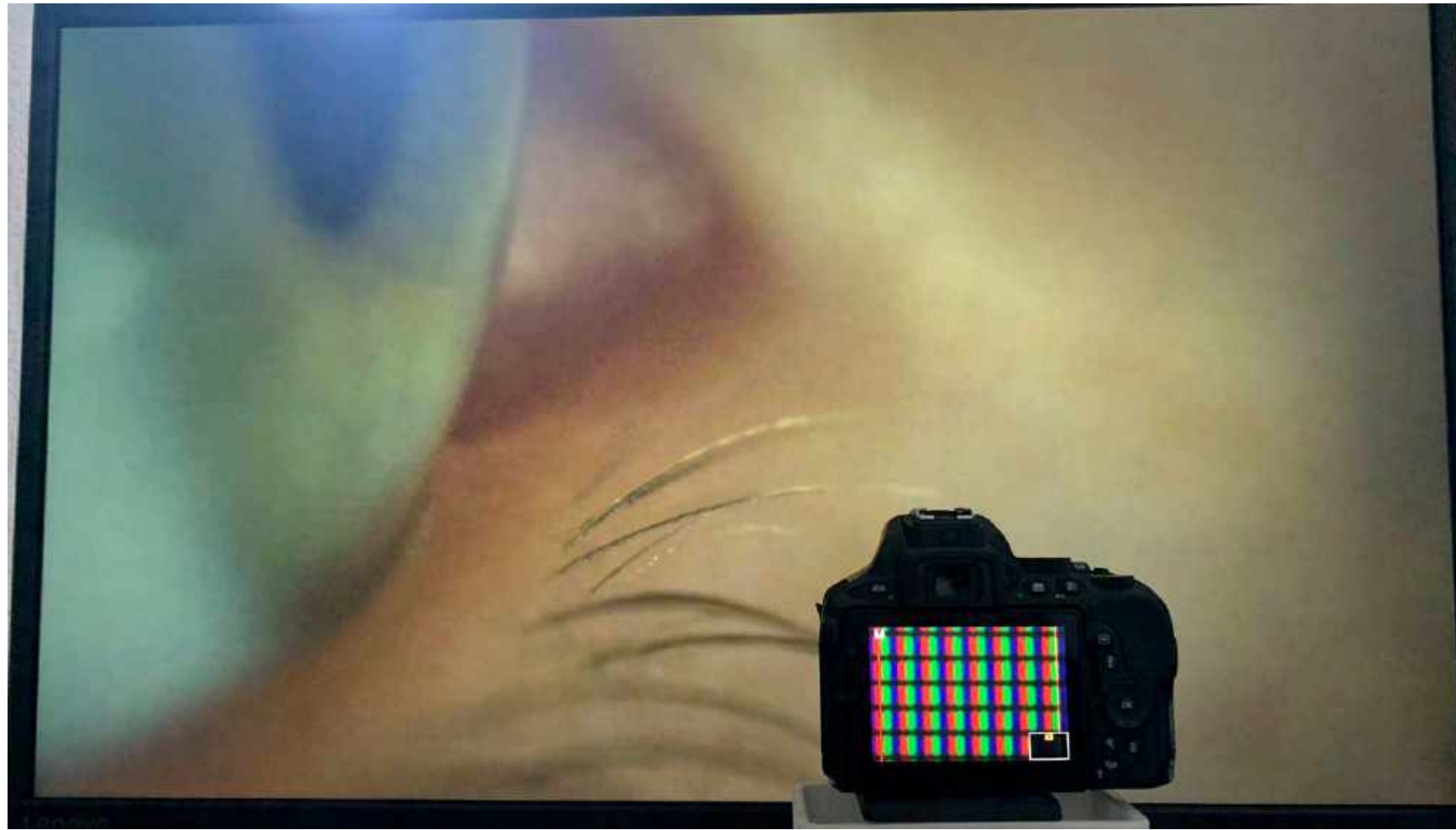
Towards the end of the animation the petals separate and then overlap as red, green and blue petals. In doing so, they create the other colours of the well known colour wheel and when they all overlap at once it creates white light, referring to my earlier research and animation experiments, learning how to imitate RGB colour and how it works.



Colour tones, 2022, 1.38 minutes, 1080p, 16:9
@Birmingham School of Art



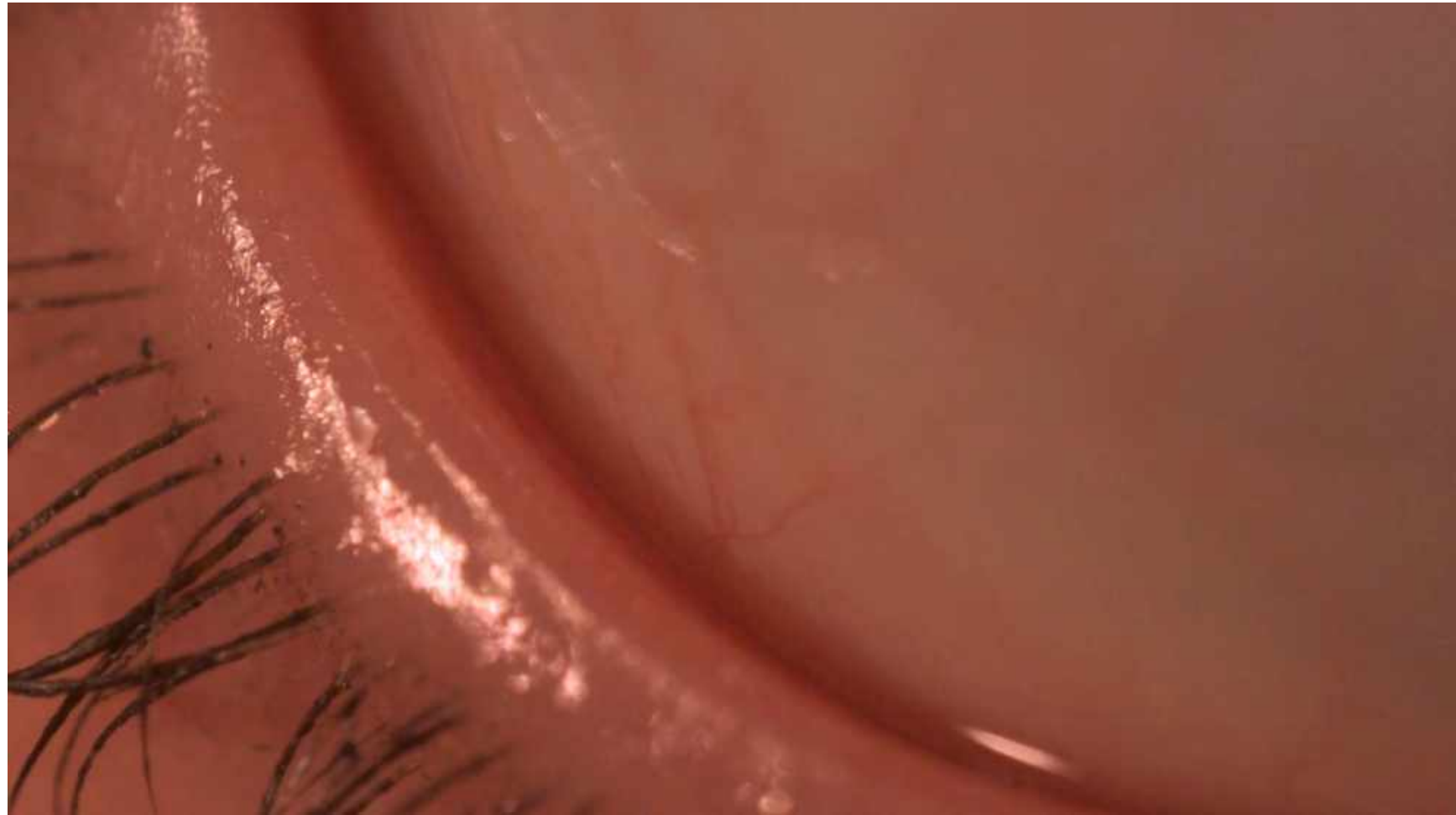
Colour tones, 2022, 1.38 minutes, 1080p, 16:9
@Birmingham School of Art



I went back to experiment with earlier footage, revisiting the 'Eye' film and experimenting with possible display options. I needed to be able to present what the camera is viewing in professional way.

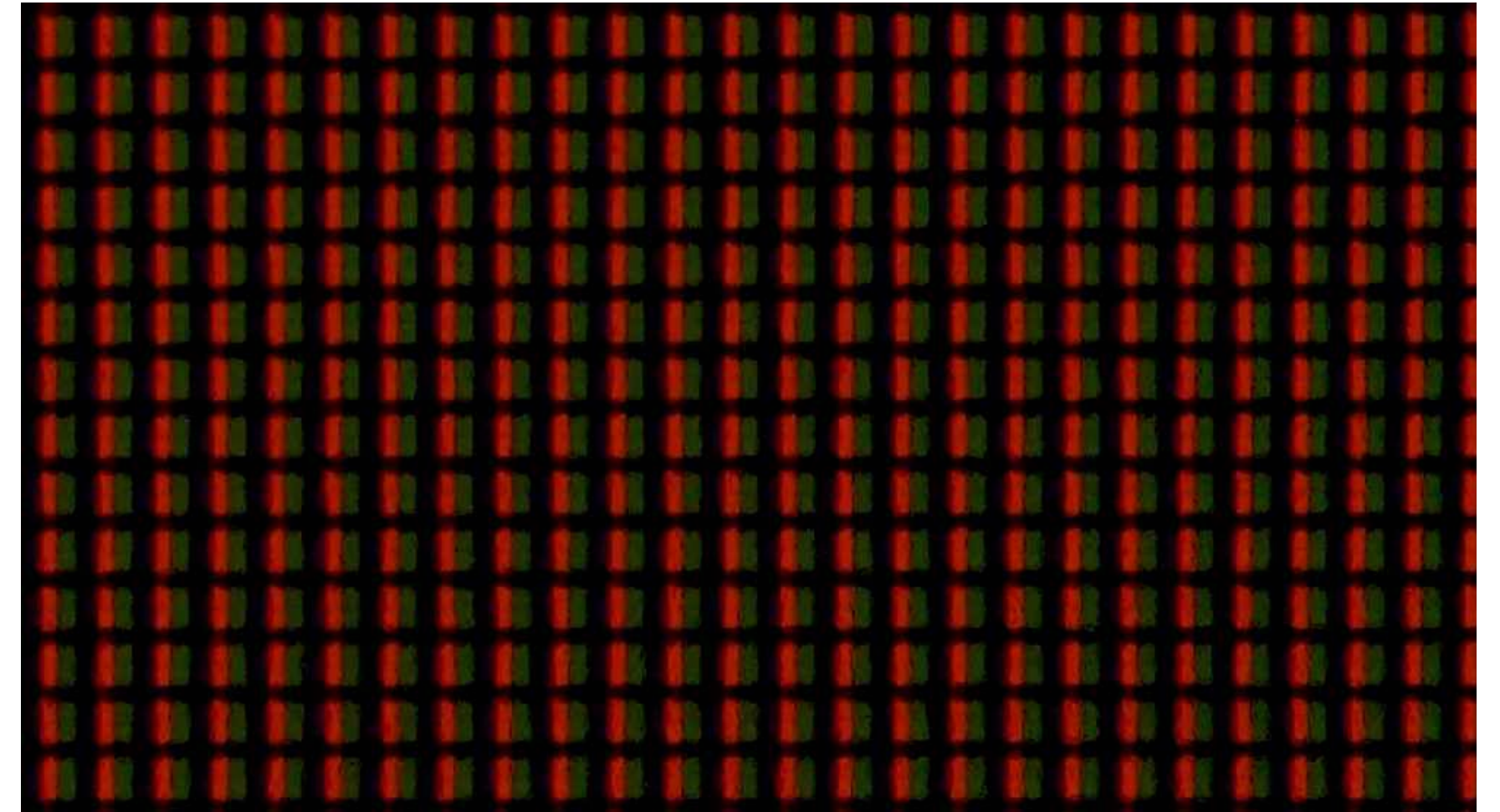


I could see it working with two screens a lot better, with a more professional look and outcome. I also experimented with having a live performance as such and show the camera with the macro lens on the screen and have the camera's live display blown up on the second screen, to make an obvious connection for the viewer that the RGB display is showing exactly where the camera is pointed at.



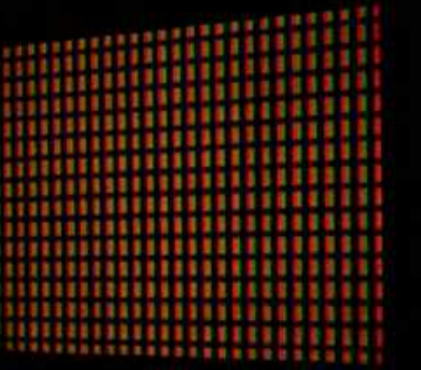
Reflection Part 1, 2022, 3.39 minutes, 1080p, 16:9

I made a new film similar to the first eye video I made, however this one was better quality as I was now a lot more advanced and knew how to work with the macro lens a lot more confidently.



Reflection Part 2, 2022, 3.39 minutes, 1080p, 16:9

I then re-filmed the footage of the pixels, due to it having to represent the exact video. I opted for a closer image of the pixels in previous work, however my final choice was to see more pixels with the RGB lights still visible as this allowed you to see movement if you looked at the image as a whole, whilst still seeing the lights turn on and off giving the two pieces a lot more of a connection.



RGB

Process Book

Olivia Smith

