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Nov 2020

Science Through My Eyes

Winners in Photo - Film Competition-2020(Photo)



Group 1 - PhD Scholars, Post-doc
Sayantan Sur



Homo sapiens cyborgiensis

Homo sapiens are the ultimate players in the game of evolution. For billions of years, we have gathered adaptations that have helped us survive. Now, science has enabled us to shape our own adaptations. In the dawn of a cyborg world, we already using bionic hands and legs, pacemaker, hearing aids. Machine and man have united to give birth to a more developed species.



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Group-2 Med., Engg., Manag. etc. students

Mahapatra Anshuman Jaysingh
Amey Shenoy

Patterns in randomness

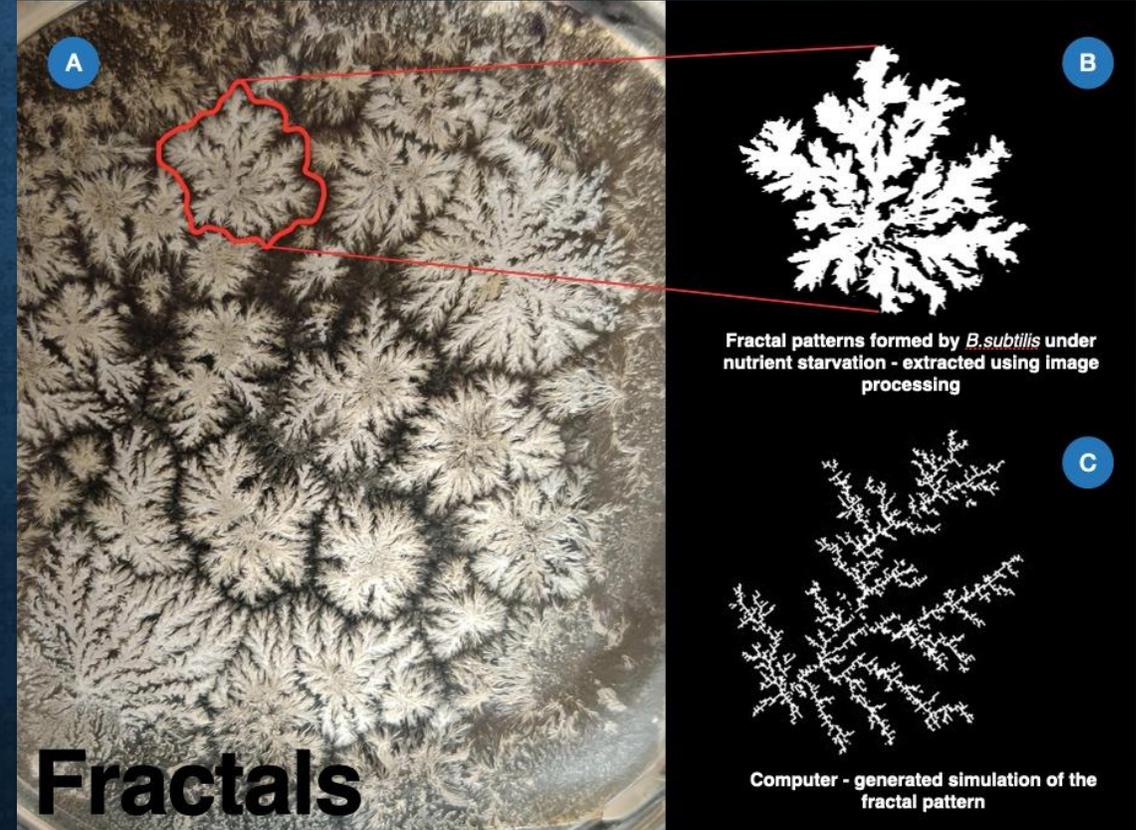
When motile bacteria are point inoculated onto semi-solid agar media, branching patterns with various morphologies are observed.

A: Fractals formed by *Bacillus subtilis* on nutrient-deprived medium; after 21 days of growth.

B: Fractal features extracted using image processing

C: Fractal generated from computer simulations using the same morphological parameters as the real-life fractals.

When nutrient concentration is low, bacteria exert diffusion-limited growth. A self-similar fractal colony is formed eventually. The patterns can be explained with models such as Diffusion Limited Aggregation and are propelled by reaction-diffusion processes. The bacteria show growth in the direction of a higher differential nutrient concentration.





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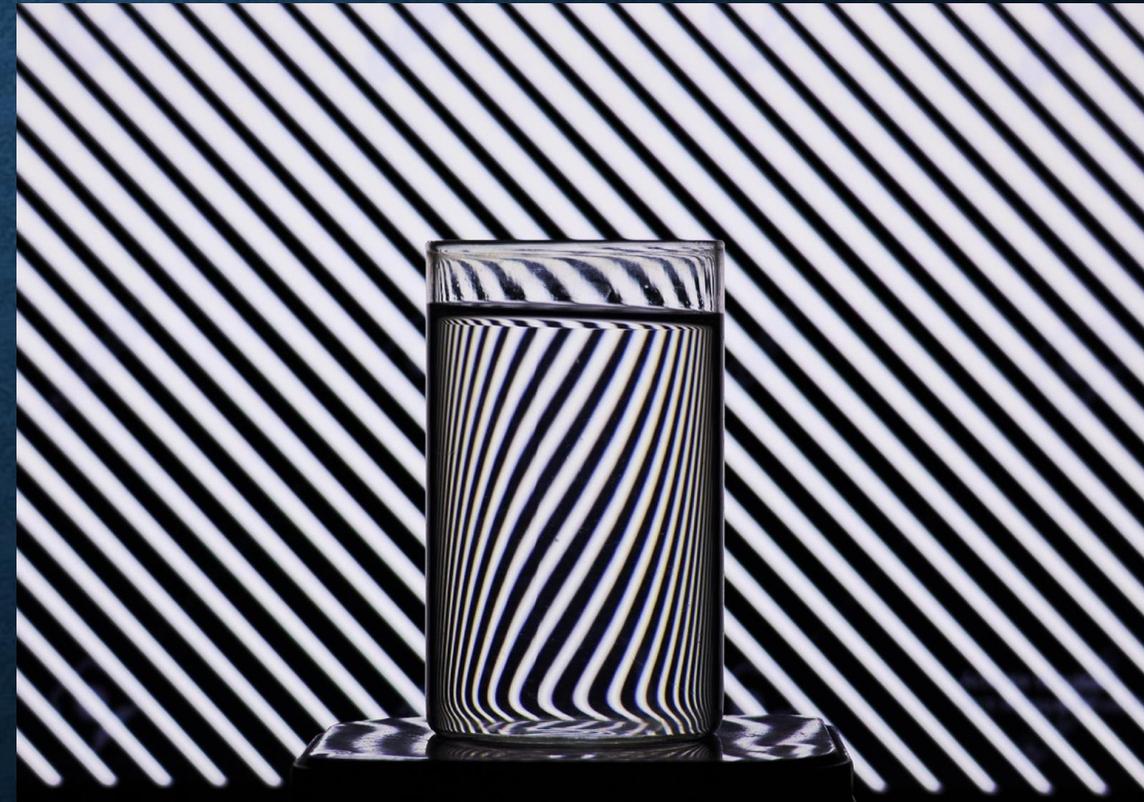


Group-3 Working Professionals

Chayan Kundu & Suparna Kundu

Refraction

The image shows Refraction with the help of household items. Here I have placed the laptop screen behind a glass of water and showed an image of black line pattern. When light travels from air into water it slows down, causing it to change direction slightly. This change of direction is called refraction. When light enters a more dense substance (higher refractive index), it 'bends' more towards the normal line. Hence, we could observe that the lines get laterally inverted when we see through glass as compared to the screen. We could also observe that the lines don't invert at the top of glass where water is not present, it only distorts the lines.





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Shriniketan Puranik & Mrunal Deepak Barbhai

Photographic menace

A photographer's menace and a poser's disappointment is 'Red Eye'. It is a phenomenon that occurs due to 'retroreflection'. Normally, light entering our eyes undergo total internal reflection accompanied by the reaction of pupil. But, camera flash does not let our pupil react immediately, thus causing light to retroreflect, i.e. incident rays become parallel to reflected rays. The light reflects from retina which is rich in blood vessels, thus glowing red. The phenomenon is also called 'fundal glow' and can be avoided by changing surrounding light during photography. Our image depicts science behind one such menace and disappointment!

Red Eyes: Photographic Menace



Flash of camera gives very less time for the pupil to react. The light undergoes retroreflection (reflected ray in the same parallel direction as incident ray) instead of total internal reflection giving a picture of the fundal glow due to blood vessels behind pupil!



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Deepika Sardana

Spider Web: The Nature's Architect

One of the most fascinating things that spiders do is they use their silk to make a rich array of architectures called spider webs. Their webs are geometric masterpieces. But a more interesting scientific fact is that these webs last for weeks without getting rotten because bacteria do not have access to nitrogen inside the silk threads.



@deepika



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Deepika Sardana

The virus that wears a crown

The image shows the structure of SARS-CoV-2 which belongs to the family of viruses called coronaviruses. They are named for the crown of protein spikes that covers their outer membrane. It is a positive sense single stranded RNA virus. RNA genome has 29,811 nucleotides, encoding for 29 proteins. Studying these various components of the virus, as well as how they interact with our cells, is important to stop this infection.





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Archana Joshi

Science at the kitchen

This painting is about the science at the kitchen. The painting is done with composing almost all kitchen equipment and painted with primary, secondary, tertiary colours in colour wheel. We all know that VIBGYOR is made with seven colours but there are several other colours rather than it. These colors are arranged horizontally in each layer to create a sense of illusion in our eyes.

The image is to say about the ability of our human eye to differentiate and understand different colours which animals cannot. It also says about the role which is being played by light and shade in each object.





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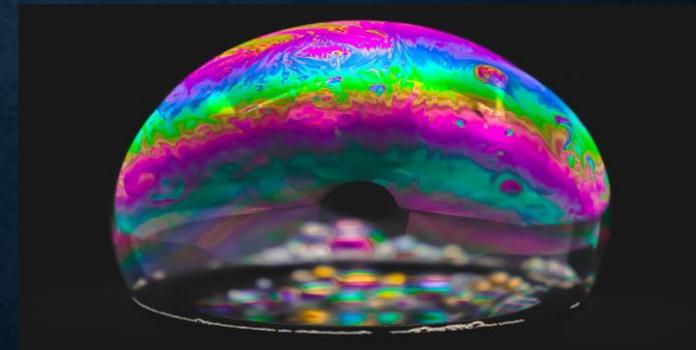
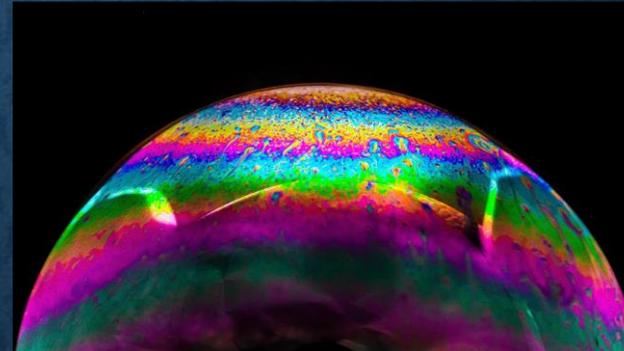
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Tonumoy Mukherjee

Colours of Existence

A Soap Bubble is an extremely thin film of soapy water enclosing air that forms a hollow sphere with an iridescent surface. When Light shines onto a bubble it appears to change colour. Unlike those seen in a rainbow, which arise from differential refraction, the colours seen in a soap bubble arise from interference of light reflecting off the front and back surfaces of the thin soap film. Different colours interfere constructively and destructively depending on the thickness of the film.

The photos were taken without any special equipments but only with a kit lens of a DSLR. It took roughly about 12 hours to figure out a home experimental setup, figure out how to make the bubble last for at least 3 minutes and also to figure out the camera settings for taking the shots.





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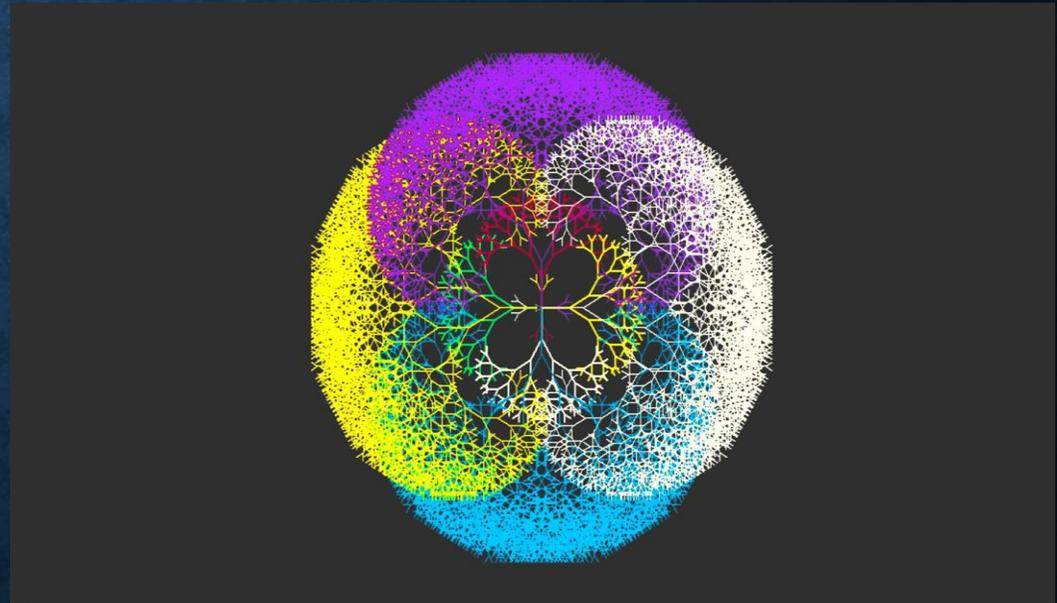
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Tonumoy Mukherjee

Abstract Digital Fractal Art Pattern

A Fractal is a curve or geometrical figure, each part of which has the same statistical character as the whole. They are useful in modeling structures (such as snowflakes) in which similar patterns recur at progressively smaller scales, and in describing partly random or chaotic phenomena such as crystal growth and galaxy formation. Fractal patterns are extremely familiar since nature is full of fractals. For instance: trees, rivers, nerve cells, coastlines, mountains, clouds, seashells, hurricanes, etc. Abstract fractals – such as the Mandelbrot Set – can be generated by a computer calculating a simple equation over and over.

This is an image of an abstract 360-degree Fractal tree pattern (A fractal tree is known as a tree which can be created by recursively symmetrical branching) created using Python Turtle Graphics.





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Supriya Chakraborty

Packaged Droplet

Nature is enriched with existence of beautiful crystals with different colours, dimensions and symmetries. Growth of crystal is a natural phenomenon governed by ambient parameters, threshold conditions are being attributed to thermodynamic feasibility and critical chemical concentrations. The cited example delineates uniqueness of a real-time recrystallisation of sodium acetate from its supersaturated solution. Repetitive directional growth and individual identity with periodic symmetry from multiple nucleating centers explain the mechanism of crystallisation. Simple examples in fostering scientific ethos within human community would be stimulating to learn secrets of nature. The underlying scientific reasoning and correlated philosophy would strengthen human-nature interface.





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Arpan Dey

Light in darkness

The image is an acrylic painting that depicts a natural phenomenon, Bioluminescence, a wonder of chemistry. Fireflies, using luciferase enzyme, substrate luciferin, oxygen, ATP and ions produces this natural COLD light. Mainly for mating calls, the duration and frequency of these flashes are unique for different functions. But Science not only provides knowledge, but provides ideas. To increase the efficiency of light production, in some fireflies the cuticle is modified into scale like geometry. This inspired the LED light technology to increase the luminescence efficiency a lot. Further, science today use bioluminescence in various biological aspects starting from gene expression to cellular uptake.





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Nisha

It shows a simple Archimedes' law states that the upward buoyant force that is exerted on a body immersed in a fluid, whether fully or partially submerged, is equal to the weight of the fluid that the body displaces. In daily life, we saw this.

A filled water glass showing a immersed onion which displace water out of the glass which is equal to its weight.





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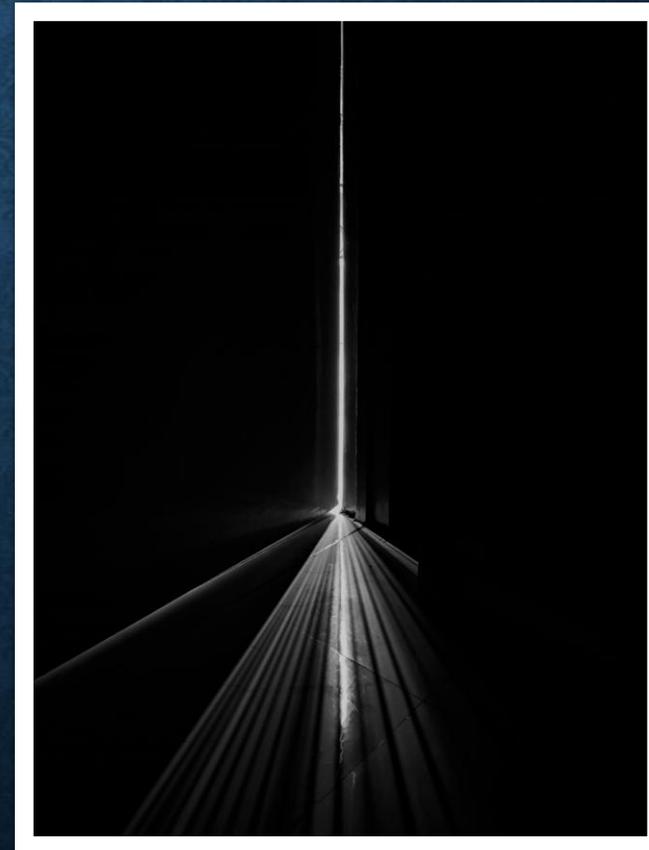


Group 1 - PhD Scholars, Post-doc

Rahul Mitra

Rendezvous with a diffracting doorway.

The image vividly depicts Fresnel Diffraction through a bedroom door in an early morning, snapped during my home isolation in Lockdown 1.0. The millimeter-sized 'slit' of the partially closed door served perfectly for morning sunrise to follow the conditions of near-field Fresnel diffraction. The vitrified floor tiles acted as 'screen', where the well-defined bright and dark fringe pattern was strikingly observed. This fortuitously fits well with the theme of 'Science though my Eyes' in everyday places. One may also conjecture that the serendipity-turned-curiosity was possible as we are amidst an unprecedented adversity.





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Sahana Vishwanth

Elastoviscin - a natural bio-adhesive

Composite picture showing an Orchid flower (Fig. A), pollinarium (Fig. B), pollinia stretched (Fig. C & D). Orchids are the most diverse group of flowering plants with more than 30,000 species having unique display of flowers. Pollinia is cohesive mass of pollen (the male gametophyte) which are compactly packed into discrete units by a clear, highly viscous elastic lipid substance called "elastoviscin". The threadlike appearance is evidenced only when the pollen grains are physically stretched. The chemical composition and properties of this can through light of its use as bioadhesives for industrial applications, medical products and for surgical use.





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Group-2 Med., Engg., Manag. etc. students

Arjun Chandran & Anandu S

Water Drop

Our busy lives have made us not to pay much attention to the meager details of life around us. The science of a drop of water is one such detail. Even though we see it on a daily basis, never do we think what makes the drop look like a 'drop'. All thanks to a very useful phenomenon called 'Surface Tension'. The teeny-tiny water molecules in that drop prefers to stay in the lowest energy state. This can be achieved if the surface area is minimum for a particular volume. Mathematics tells us that 'a sphere' is the shape which conforms with that and that's why our water drops are 'spherical'!





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Arjun Chandran & Anandu S

Reflection

The true beauty of nature can be witnessed by the spectacular phenomenon of reflection of light. In the given picture the surrounding scenery was captured by the crystal globe in an inverted form as a physical example of the manifestation of the laws of reflection.





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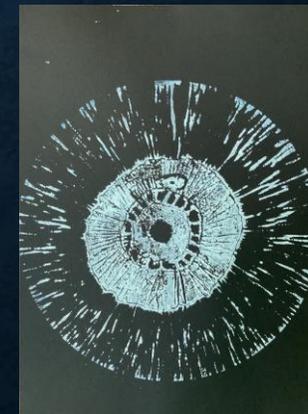


Group-2 Med., Engg., Manag. etc. students
Roshni Rebecca Samuel

Patterns of Climate Change

Tree rings, coral rings, and stalagmite rings communicate a language. The patterns they hold as archives in their rings give indicators on precipitation levels, ocean salinity, and temperature from over thousands of years. What preserves these three types of rings is their longevity. In the case of trees, there is something that controls aging on the tip of a chromosome known as a telomere. Corals and trees live for thousands of years and therefore record data for over thousands of years which is a precious archive for scientific investigation. I use art to depict the information hidden in these archives.

1. Coral Rings Print (carved on woodcut)
2. Tree Rings Print (carved on woodcut)
3. Stalagmite Rings Print (carved on woodcut)





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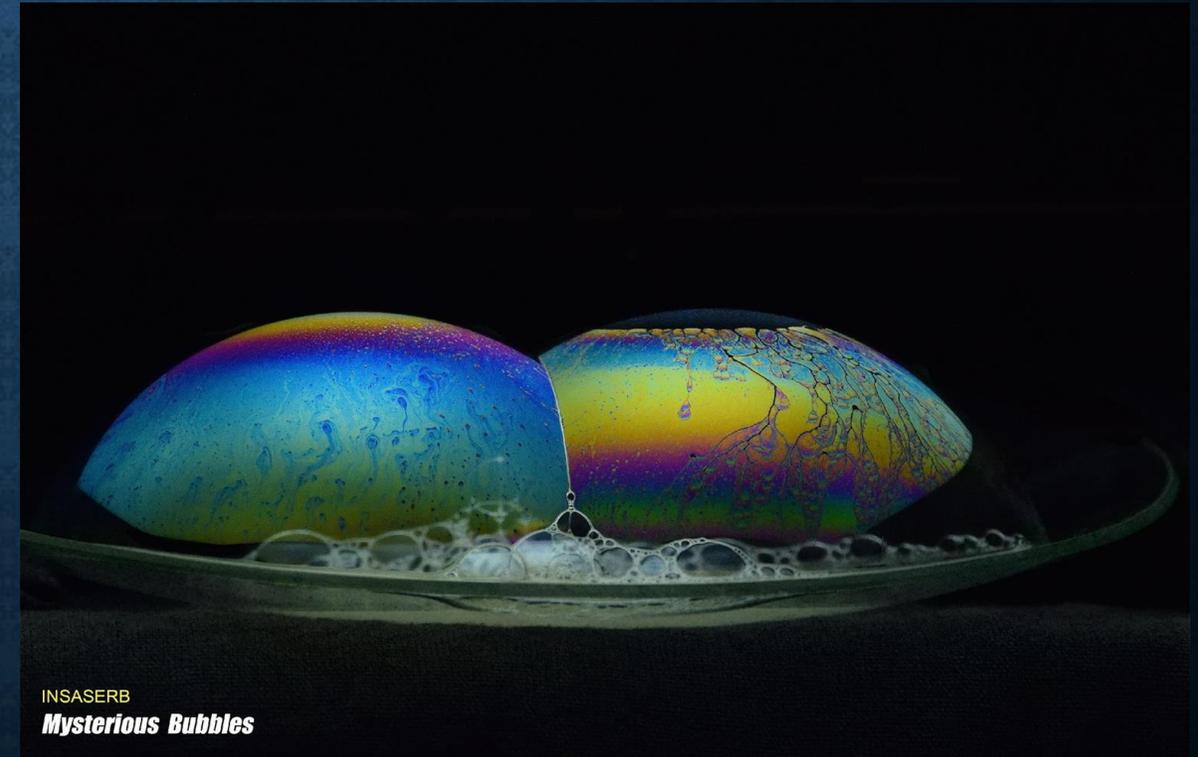


Group-3 Working Professionals
Supriya Chakraborty

Mysterious Bubbles

Bubbles compose a world of fantasy following stringent scientific logic. Long chain surfactant separates water molecules apart in lowering surface tension to form a bubble.

Achieving minimum surface area with least energy configuration as governed by laws of thermodynamics, substantiate the spherical nature of bubbles. Frequently changing colour of bubble is attributed to interference of light, reflecting off the front and back thin film wall surfaces. The cited example of surfactant-water bubbles under direct projection of white light delineates tension derived time-dependent movements of tiny droplets on the bubble surfaces, being self indexed through indigenously dynamic colour coding.





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Chirag Kalelkar & Akshita Sahni

Soap bubbles inside a soap bubble

We concocted our own soap bubble formulation which yields large, stable soap bubbles: A slurry of 1.5g guar gum and 10ml isopropanol was made in a small beaker and poured into 35.7g of Fairy/Fairy Ultra (Procter and Gamble) liquid detergent with constant stirring. This mixture was diluted with 1000g tap water and stirred continuously until a uniform composition was obtained (with 28:1 dilution). 2g of baking powder was added to the above solution with constant stirring. The photo shows a large soap bubble produced with our recipe. Note the three smaller bubbles within the larger one. The hoop has a diameter of 17.5cm.





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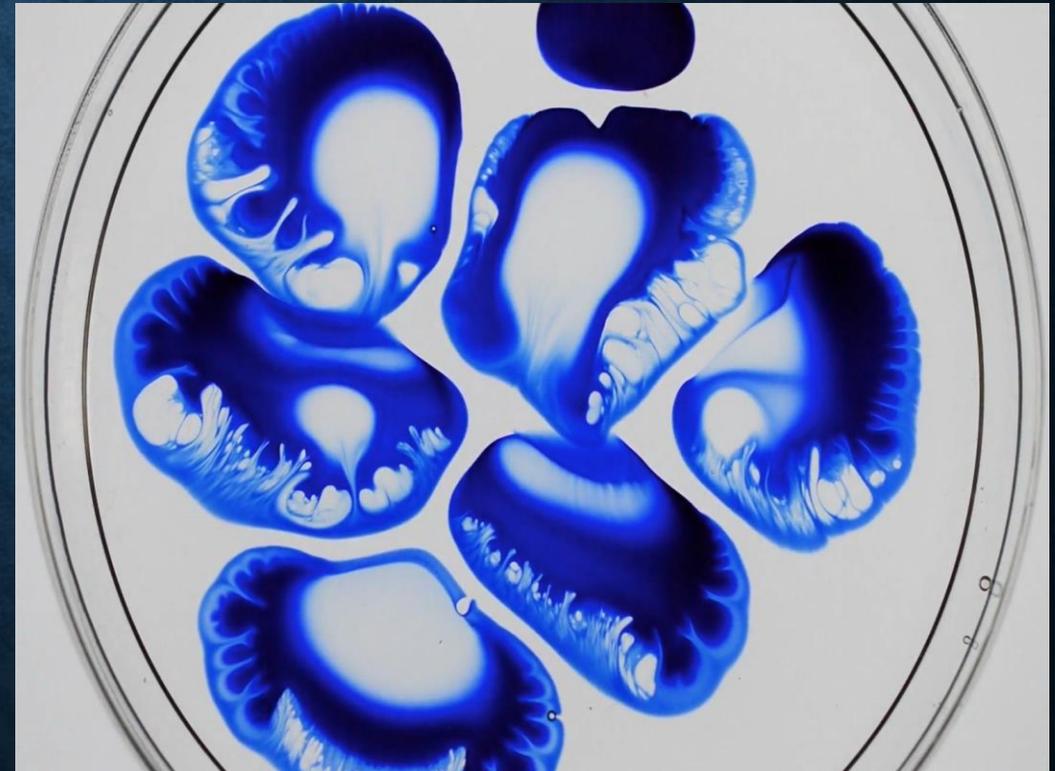
Group-3 Working Professionals

Chirag Kalelkar

Ink drops on glycerol layer

The Marangoni effect pertains to flows driven by surface tension gradients.

Gradients of surface tension arise due to gradients in temperature or surfactant concentration on the interface between two fluids. A differential tangential (surface) stress causes motion of the liquids away from regions of low surface tension to regions of higher surface tension. In this incredibly simple experiment, we place drops of ink (Parker Quink blue ink) on a shallow layer of glycerol in a petri dish to obtain this exquisite pattern. The exact formulation of the ink is unknown.





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Sridhar Banerjee

Science through My Eyes

Nature reveals its deepest secrets when we decode its own language, known as Science.
Science is the key to discover the grand symphony among the immense diversity of Nature. The thread to connect the tiniest particles with gargantuan galaxies. The locus of ever-flowing matter, energy and time throughout everything we know and don't know. By learning nature's own language, we discover that we are not only the spectators of this grand show of the universe, but active participants of it. Science is the art of unifying mankind with Nature.





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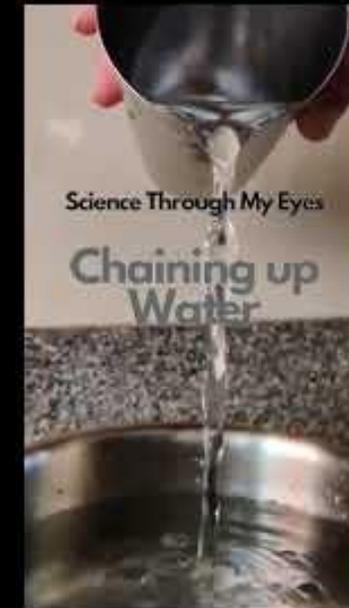


Group-2 Med., Engg., Manag. etc. students

Satya Prakash Panda & Parth Chandak

Chaining up Water

The stream of water coming out at the mouth of the container is stretched out horizontally due to normal reaction of the container. When it leaves the mouth, the surface tension tries to pull back on the stream to make it cylindrical to minimise the contact area with air by providing a restoring force. But in its attempt, the force results in widening it in the perpendicular direction. The surface tension in effect sets up oscillations between two states of horizontal cross section along length of the stream until the instability of the flow causes disruption of the shape.





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Group-3 Working Professionals

Anya Chaudhuri

The Colour of Water

The colour of water is blue due to the selective absorption of wavelengths towards the red end of the visible spectrum. This energy is absorbed due to the vibrational frequencies of the water molecule that extend into the visible range. The effect is apparent in water that is atleast a few metres deep and prominent in deeper water.





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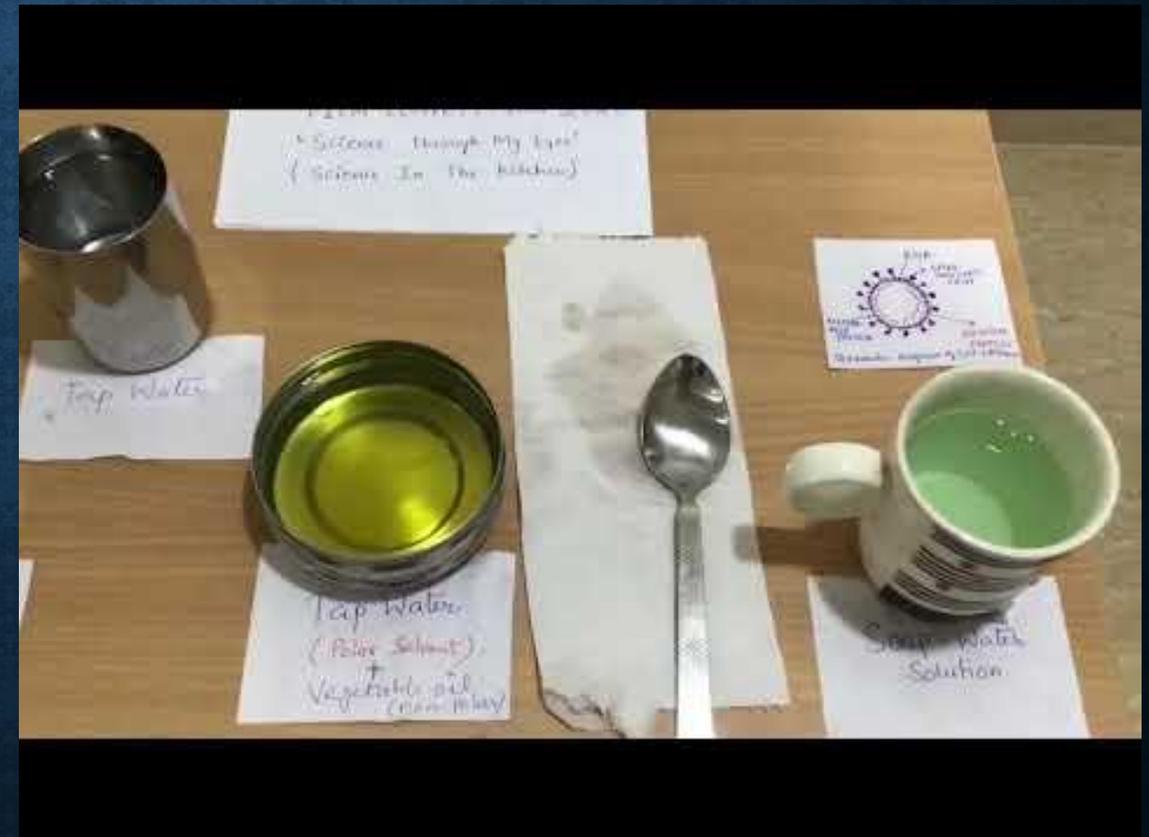


Group-3 Working Professionals

Priyatosh Ranjan

An Experiment to show how handwashing with soap kills novel coronavirus

WHO has declared COVID-19 outbreak, a global pandemic on March 11, 2020. In this video, I have performed an experiment and demonstrated why and how soap-water solution and not only water is preferable in the fight against novel coronavirus. Structurally, coronavirus is an enveloped virus consisting of lipid bilayer as its outermost covering. The chemical structure of soap consists of non-polar fatty acid tails, structure similar to the lipid layer of coronavirus envelope. Thus, soap molecule penetrates into virus envelope; it splits it apart, breaking the virus open. This is because solvents work on the principle of "Like Dissolves Like".





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Mimansa

SARS-CoV-2 : A PANDEMIC

Entry to this competition is one-minute stop motion animation of emergence, spread, infection cycle and preventive measures for SARS-CoV-2. Components of this video are origami models that is made by paper folding to add creative and fun arc to the learning. It is created as a simple approach with a notion to engage all age groups and communities.





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Group-2 Med., Engg., Manag. etc. students

Tushar R. Lad & Aditya R. Lad

The Essence of Wildlife

This is a short wildlife documentary showcasing some of the rich wildlife that the Western Ghats of India holds, the short documentary is filmed in Belgaum, Dandeli, and karwar.

The film includes one of the spectacular and fortunate shots of two male Fan-throated lizards under a territorial fight that we encountered, A Malabar giant squirrel feeding on the fruits, spectacular landscape shots and lot more.





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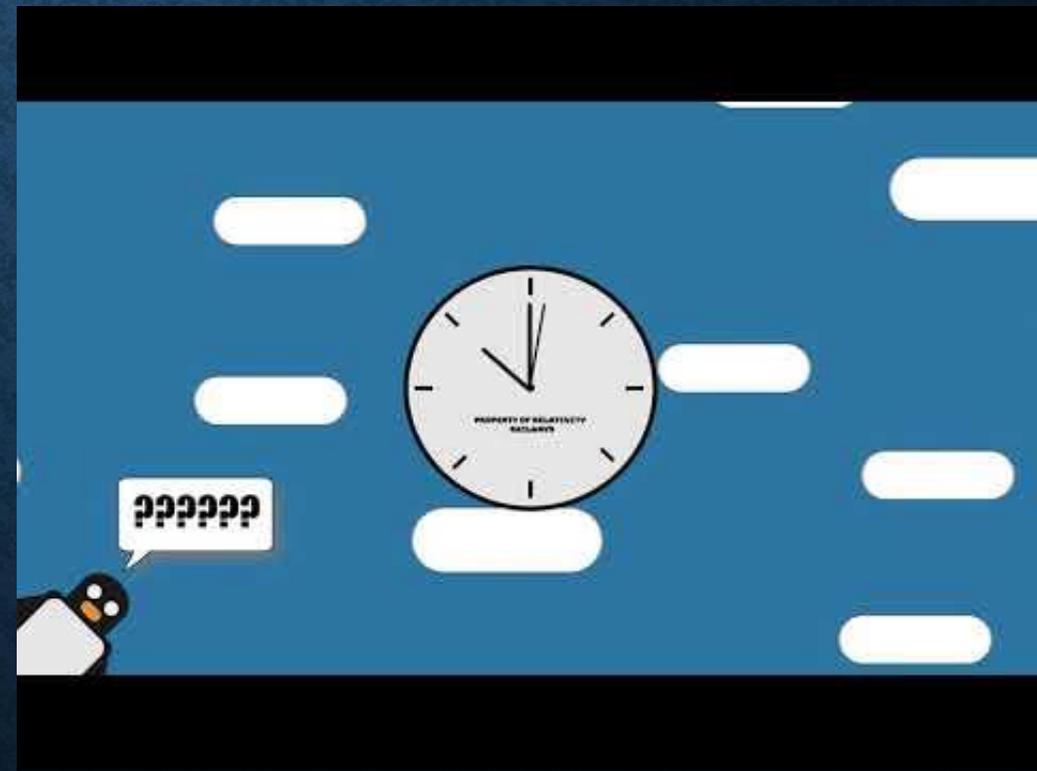
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Group-3 Working Professionals
Akanistha Banerjee & Arna Neogy

Ideas or Equations?

Science has always been driven by ideas, and yet even today new and bold ideas are ridiculed. This work gives a couple of examples of the boldest ideas of sciences that have made us today what we are and how although initially discarded are today the backbones of the most fascinating research. The video promotes the joy of thinking and unveiling the truths of the universe with our minds.





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Group 1 - PhD Scholars, Post-doc

Nitheesh M. Nair

Garikapati Nagasarvari

Science through my eyes - Silica Gel

Silica gel – the granular substance in those ubiquitous small sachets that come with a number of products/packaging materials – from water bottles to bags to microscopic glass slides to shoes, acts as a desiccant (keeps the products dry). But what happens when it adsorbs moisture? Self-indicating silica gel used in research labs is usually blue (owing to the addition of ammonium tetrachlorocobaltate(II) or cobalt(II) chloride) and turns pink when the nanopores in the silica gel adsorb water as shown in this video. The used silica gel can be reheated to desorb the water before being reused.





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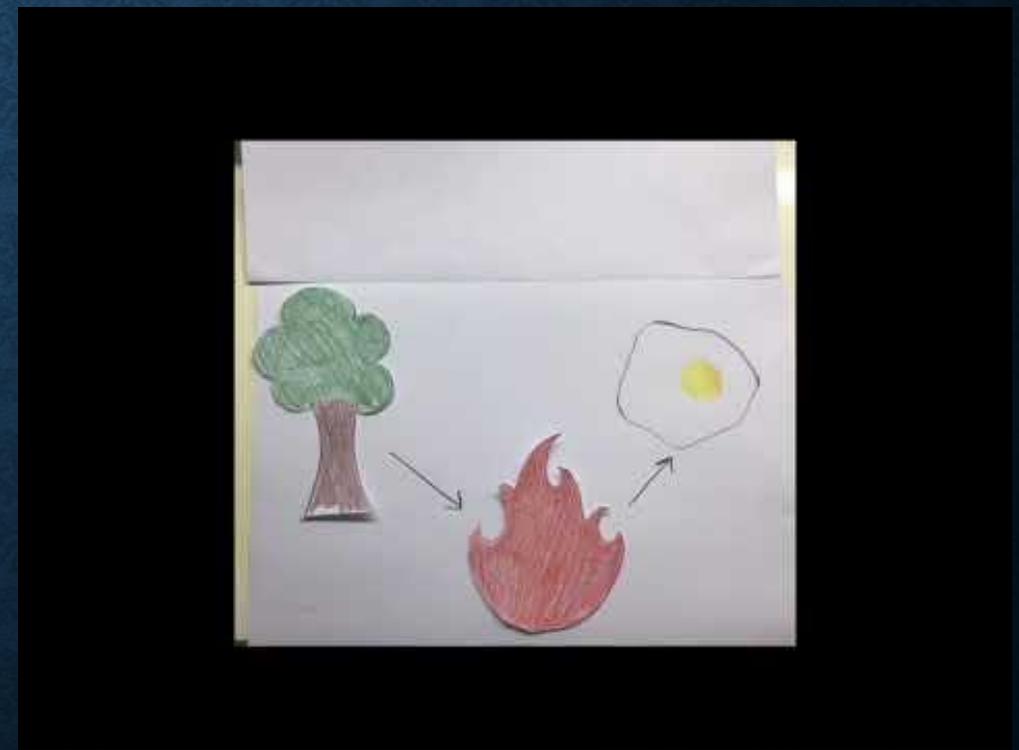


Group-2 Med., Engg., Manag. etc. students
Shivika Marwaha

The Evolution of Science Through My Eyes

Everything from the rainbow I see outside my window to the fried egg I eat for breakfast is science through my eyes. Thus, I decided to choose a simple action, frying an egg, to explain how science through my eyes has developed and changed as I grew up and learnt new scientific facts.

Frying an egg may seem like a simple kitchen chore but in fact, it involves a series of complex changes that occur at a chemical and molecular level. My film aims to display the evolution of understanding a fried egg from the age of 5 to 18.





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Vivek Kannadi & Suchibrata Borah

INSASERB_ Superhydrophobic and Germicidal Nano-coating for PPE

Dr. Atikur Rahaman, Assistant Professor in the Department of Physics, Indian Institute of Science Education and Research (IISER) Pune and co-workers are working on the development of superior PPE kit coated with a superhydrophobic layer. The layer is based on hydrophobic nanoparticles, which also shows effective germicidal properties. Due to the super-hydrophobicity of the layer, the droplets caused by sneezing or coughing of COVID-19 patients will not get attached to the PPE kit easily. If some percentage of the droplets stick to the kit, the germicidal property of the layer will take care of it.

