



Foundation for Advancing
Science and Technology



National Science Centre, New Delhi



SCIENCE

IN

FOCUS

Science Photography Competition

2022



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Science and Technology



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ABOUT

Science in Focus is the flagship science photography competition hosted by the **India Science Festival** under the aegis of the **Foundation for Advancing Science and Technology (FAST India)**.

Science in Focus provides a unique opportunity for science and photography enthusiasts to share their encounters with science in everyday life and learn from professionals.

Photography has emerged as a powerful tool to tell stories of science and simplify scientific ideas and concepts that can be sometimes challenging to convey through words. For this reason, photography serves as an effective channel of communication and engagement between science and society. Photography has also become a handy tool for capturing subjects or phenomena not visible to the naked eye, thereby, opening up a whole new world of scientific exploration.

The first edition of Science in Focus received more than 200 entries, out of which the top 26 photographs were showcased at an exhibition at the **National Science Centre, New Delhi** from the **21st May to 4th June 2022**.

A virtual interactive session with NatGeo Photographer **Prasenjeet Yadav** and two hands-on photography workshops were organised as part of the exhibition for young adults with **nature and wildlife photographer, Ashir Kumar**, at the **National Science Centre**.

This booklet is a compendium of the **top 26 entries** of **Science in Focus 2022**.

SCIENCE IN FOCUS

Winners of Science in Focus 2022!

1st prize



Monsoon Leaves

By Mridula Sharma

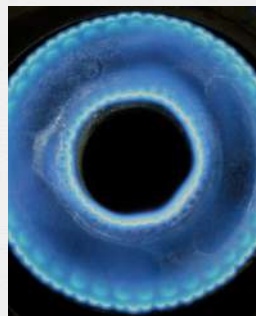
2nd prize



Magic of Water

By Satyam Saurabh

3rd prize



Watching Stove

By Sarah Weiler

A few stills from our Science Photography exhibition



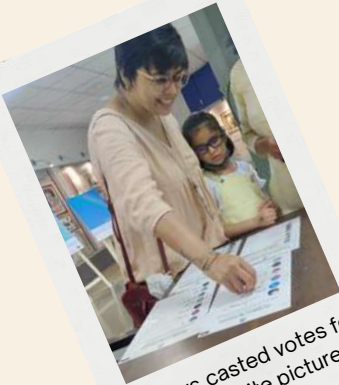
People of all ages visited the Photo Exhibition



We asked visitors to write the first thing that comes to their mind when they hear the word Science



FAST India CEO Jayant Krishna (left) with Rama Sharma, Director, National Science Centre, Delhi



Visitors casted votes for their favourite picture at the exhibition



Mridula Sharma, the winner of Science in Focus 2022, with a young visitor

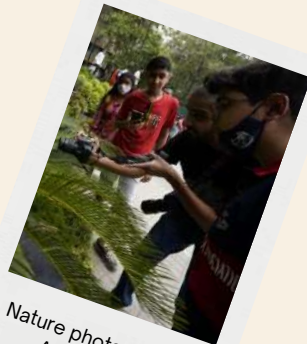
A few stills from our Science Photography exhibition



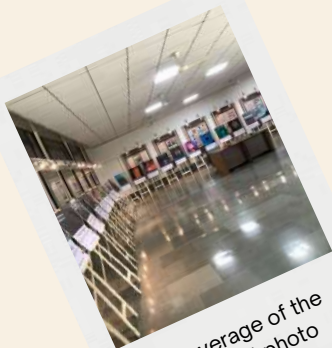
Engagement with public and school children took place at the exhibition



We held a workshop on nature photography which was facilitated by Ashir Kumar, a professional photographer



Nature photographer Ashir Kumar demonstrating how to click macro photographs



A coverage of the physical photo exhibition at the National Science Centre, Delhi



A participant trying her hands out at macro photography during the nature photography workshop



Nature - The Greatest Artist

Deep Roy, PhD Senior Research Fellow
Indian Institute of Science Education and Research, IISER Mohali

This macro shot of a single *Bacillus subtilis* (a type of bacteria) colony justifies a line by Antoni Gaudi-"Nothing Is Art If It Does Not Come From Nature". An accidental contamination of some 60 days old lab media plate displayed these beautiful concentric rings of calcite precipitate over the colony surface that contributes to antimicrobial resistance, a natural phenomenon in bacteria that makes them resistant to the effects of antibiotics. Curious and intrigued, I dug deep into some scientific journals that said these occur when *Bacillus subtilis* degrades amino acids, arginine and purines, present in the lab media over time to generate urea which when further hydrolyzed by urease alkylates the medium causing calcium carbonate precipitation.



Nature's Spider Web Necklace

Zille Anam, Program Coordinator, IndiaBioscience, Bangalore

I woke up surrounded by these beautiful dewdrops caught by spider silk, hanging stably weaved into a necklace on my last camping trip to Pawna, Maharashtra. Had there been a hair instead, these structures would not have formed. Why?

The science lies in the physics of fluid and chemical and microstructural properties of nano-fibrils that make up the web. The mechanism of dewdrop collection is via the formation of large dense knots due to sticky adhesive properties of water. The process is driven by two forces: gradient of surface energy on fibrils and spindle shape of knots in the spider web.



The Colours of Nature

Karthiyani Vijai, Student, Indian Institute of Science
Education and Research (IISER), Kolkata

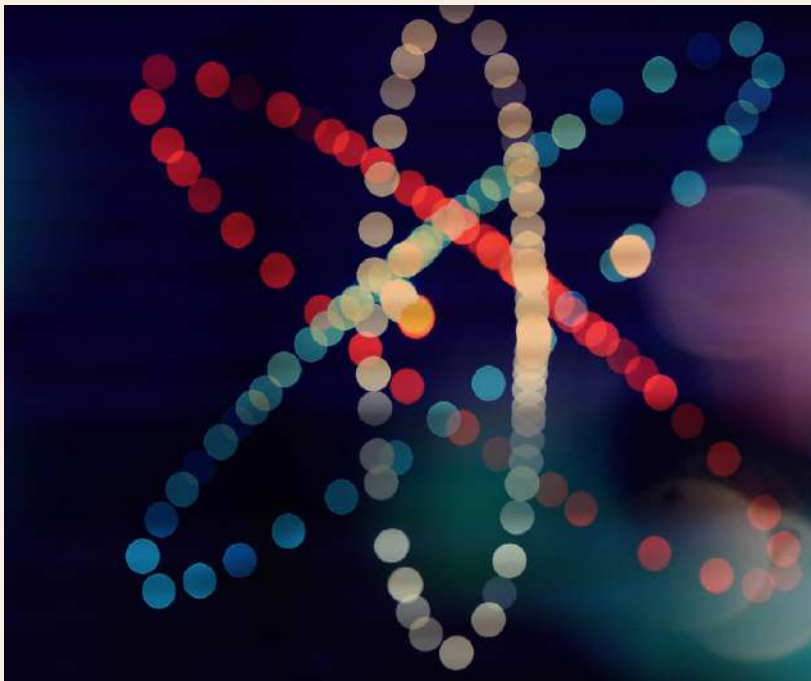
There was a beautiful river near my father's house and since the weather was good we all took an evening walk along the riverbank. My sister and I sat on an abandoned boat on the shore to look at the beautiful view that I have captured in this photo. The orange and blue clouds gave life to the sky. What's the science behind this you ask, look at the clouds all that happened due to the scattering of blue light and the ability of red light to travel through great distances without scattering much.



Towards Hope

Udamya Mishra, Student, Tagore International School, New Delhi

One fine evening, I had the opportunity to click an aeroplane seemingly traversing into a rainbow. Rainbows are an optical illusion: a result of refraction and reflection of sunlight. The light is reflected internally by the back of the scattering water droplet. Sunlight appears white as our eyes perceive all the colours of the rainbow mixed as white light. The electromagnetic spectrum (the entire range of existing light) is composed of light with many different wavelengths, and each reflects at a different angle. Thus, the spectrum separates, producing a rainbow.



Science and Bokeh

Siya Aneja, Student, Tagore International School, New Delhi

Bokeh is one of the most beautiful types of photography. With this image I have attempted to enhance the beauty of the bokeh photography with adding a touch of science to it. The three colours highlighted; Red, Blue and White represent Passion, Serenity and Peace respectively. The subject in this image also resembles the structure of an atom and conveys that these values come from within. Atoms are the building blocks of life, and thus these values unify us.



Motion and Perspective

Siya Aneja, Student, Tagore International School, New Delhi

This image is inspired from the scientific concept of motion, reference point and perspective. One may perceive an object in motion, but the same object may seem at rest from another observer's perspective. In the image, the orientation of the face may be perceived differently by different observers. This doesn't prove any of them wrong! This concept of perspective and reference point applies to our life too. The story behind this image is to inspire the viewers to find the perfect perspective of life, even if it seems wrong to others. Make life beautiful in your own way!



Ultra Light-weight Material

Sukanya Bhat, BS MS Student, Indian Institute of Science
Education and Research (IISER), Pune

Bird, wind, water helps in the sexual reproduction of plants in which pollen from one flower moves to another plant. The pollen grain is one of the sensitive and delicate parts of the flower. The measurement of ultra-lightweight material can be performed by keeping the material on pollen grain and checking its sustainability. The retention of pollen grain (as in the image) indicates truly ultra-weight material.



Drosera: An Insect predator

Rekha Sharma, Guest Lecturer, Kamla Nehru Mahavidyalaya, Nagpur

Drosera have amazing predatory behaviour that can capture the prey. Mimicking such natural intelligence in artificial systems with systematically functions of multiple information perceptions.

Low concentration of nitrogen in environment is expected to modify Moorland plants insectivorous. Alpine and subalpine Mulan ecosystem contain unique plant communities often with many endemic and threatened species some of which depend on insect pollination all through these ecosystems are vulnerable to climatic change few studies have investigated flower visiting insect in such ecosystems.



The Full Moon Made Me Do It

Shardul Lokapure, Student, Blossom Public School, Pune

A “Supermoon” occurs when a Full Moon coincides with the Moon’s closest approach to Earth in its elliptical orbit, a point known as perigee. It appears 17% bigger and 30% brighter. Supermoons only happen 3-4 times a year as, throughout most of the Earth's orbit around the Sun, Perigee & Full moon do not overlap. But this Supermoon captured rising again exactly behind the cellular antennae was a blissful experience in itself! Was eagerly waiting to see this full Moon through my newly bought Telescope and this couldn't get any better.



Silver Crescent

Suhaani Saraogi, Student, Springdales school, Dhaula Kuan, New Delhi

Telescope, the most important investigative tool in astronomy provides a means of collecting radiation from celestial objects, even those in the far reaches of the universe.

In a refractor the light from a celestial object passes through the objective lens. Light will be inverted at the focal plane. A second lens- eyepiece is placed behind the focal plane and enables the observer to view the magnified image. Little did the man know that Galileo's pioneering work will contribute dramatically to astronomy so much so that the silver crescent that hangs in the sky will look so mysteriously and mystically close.

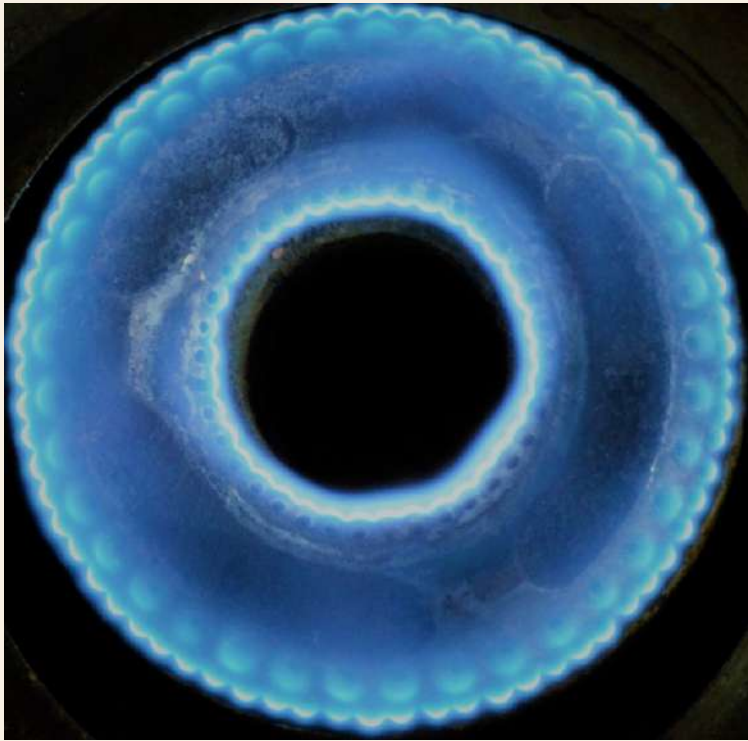


Magic of Water

Satyam Saurabh, BS-MS Student

Indian Institute of Science Education and Research (IISER), Pune

Water is an integral part of life and a universal solvent for many chemical and biological phenomenon. It is still a mystery to understand the behavior completely at a molecular and atomic level. It has many magical properties that make it more interesting to comprehend and utilize in different aspects like water splitting for energy production. The spherical shape of water is always attractive, and it has the least surface area among all other shapes.



Watching Stove

Sarah Weiler, Volunteer at an NGO based in India

Every morning it is the first eye I am looking into. Every morning it makes my tea hot and my breakfast ready. It is simple science, but I am impressed by the heat and force, which rises through this eye. I am from Germany, where usually electrical stoves are used. But since I am in India, I started to appreciate the gas and the fire, which creates this eye and which makes cooking more exciting, regulable, efficient and intense. Every day million of people ignite the flame and provide through this scientific reaction their family with delicious food.



Tigers: The Show of Dominance and Their Love for Trees

Neerval Aggarwal, Data Analytics Director, IHS Markit

The tree hugging behaviour of the Pench buffer zone tigers were on full display during the monsoon season in Pench National Park, India. This behaviour is a display of their dominance as they mark their territory by leaving their scent and scratch marks on trees. This is also used to smell if there is presence of other tigers in their territory.



Monsoon Leaves

Mridula Sharma, Student, VIT Vellore

The image represents the scene of raindrops on fresh Colocasia leaves in my grandmother's farm. The central raindrop on the enormous Colocasia leaf had a beautiful shimmer to it which gave a mirror image of the tall plum tree in the same farm, surrounded by little round raindrops travelling through the veinous leaves. This sight served as a beautiful treat for my camera and then to my stomach as my grandmother cooked the leaves for a traditional dish made of Colocasia leaves, famously consumed in Himachal Pradesh.



Fiery Tungsten

Khyati Singhi, Student, Arwachin International School, Dilshad Gatrden, Delhi

Tungsten is a rare metal found naturally on Earth. It is used as electrodes, hearing elements and as filament in light bulbs. Tungsten has high melting point which is why it is used in light bulbs. When current is passed through it, it heats up and glows which gives it a fiery appearance. Nowadays people have started using LEDs, so I thought of capturing the moment before no one uses incandescent light bulbs anymore.



The Dance of Mechanical Waves

Atharva Wani

During COVID, as the world moved indoors, staying creative as a photographer needed some innovation. I had seen a scene in a well-known TV show and a few YouTube videos which featured non-newtonian fluid on a speaker. This inspired me to create something unique and visually spectacular using a study lamp, talcum powder, and a speaker. The way the powder was launched from the speaker, coincidentally looked like a dancing figure of a woman hence the title “The Dance of Mechanical Waves”.



Intensity

Anshuman Jain, Student, Pravara Institute of Medical Sciences,
Ahmednagar, Maharashtra

You do not always get access to an operation theatre (OT) to photograph the place and people. Fortunately, as I am a medical student, I was allowed inside the sanctum sanctorum. OTs are not simply equipment, few technicians and a handful of surgeons, encapsulated within four walls. This is where miracles happen, and where the divine powers manifest themselves much more frequently than they do at places of worship. OTs are also the arena where humans' greatest gallantry, fortitude and equanimity are tested and witnessed. Tragically, not all operations are a success and this brings agony unbound. Notwithstanding, the surgeons are people of steel. They seldom get dispirited, as they grapple with their demons and move about in life with an indefatigable determination to save lives.



Laws of Attraction

Ananya Saraogi, Student, Springdales School, Dhaula Kuan, New Delhi

Ferromagnetism may be the most noticeable form of magnetism, but electromagnetism is arguably the most important. The same poles of a magnet do attract each other, while the opposite poles repulse each other. However, both the poles remain indivisible in a magnet. It is impossible to separate north pole to south pole or vice versa.

This little piece of magnet is just like the molten core of our Earth which is essentially a giant magnet with corresponding geomagnetic north and south poles. It is depicting how the tear drop shaped magnetic field that earth generates provides for brilliant aurorae and is critical to the protection of our coveted atmosphere.



Lighting Matchsticks: A Scientific Series

Udamya Mishra, Student, Tagore International School, Vasant Vihar, New Delhi

We light matchsticks everyday but we seldom think about how fire is produced. By clicking this picture, I wanted to highlight the science behind the flame produced. The box has red phosphorous on its sides and the match head has potassium chlorate. By rubbing the match against the sides of the box, due to friction heat is produced which changes red phosphorous to white phosphorous. White phosphorous acts with potassium chlorate and oxygen to produce the flame.



Red-crested Pochards in Winter Migration at Gajoldoba Wetland

Sanjit Kumar Saha, Divisional Forest Officer, Office of the divisional forest officer, Coochbehar Division, Directorate of Forests, Government of West Bengal

This is the image of a flock of Red-crested Pochards in their wintering habitat of Gajoldoba Wetland in the Jalpaiguri District of West Bengal. The scientific name of this bird is *Netta rufina*. 'Netta' is a Greek word, meaning Duck and 'Rufina' is a Latin word, meaning 'Golden-red'. Their winter migration from southern Europe and Central Asia to the Indian subcontinent mainly for refuge and food through the Central Asian Flyway (CAF) helps to conserve inland wetlands like 'Gajoldoba' from the 'Ornithological' perspective. They are feeding on submerged hydrophytes by diving and upending.



Surface tension-floating wasp

Latika Sharma, PGT-Biology, Springdales School, Dhaula Kuan, New Delhi

This thirsty wasp came for a sip at our pigeon bowl and perfectly displayed the science of Surface Tension and we saw it floating on water. Surface tension is the property which makes water molecules attract each other and allows the surface layer to shrink, occupying minimum surface area.

Water (H_2O) in the open has air on one side and water on the other. We call it an air-liquid interface. Surface attraction leads to a greater attraction between water molecules (a property called cohesion of molecules) than between water and air (adhesion of molecules). Because of the relatively high attraction of water molecules to each other through a web of hydrogen bonds, water has a higher surface tension (72.8 millinewtons (mN) per meter at 20 °C) than most other liquids.

Though the wasp is denser than water, it is also lightweight. The non-wettable property and the lightweight nature of the insect permit its floatation on water where the surface tension exceeds the pressure applied by the tiny wasp.



The Wheel Making

Rathin Dey, Police Personnel, West Bengal Police

The wheel is the most important invention ever, it had a fundamental impact on transport and later on agriculture and industry, a bullock cart with iron and traditional wooden wheels. He is making many wheels per day. I am passing from his workshop then I notice that he making the wheels and I trying to take some photo of this.



Mutualism-Benefiting Together

Mahavir Sharma

Ant-Aphid Mutualism- a form of population interaction, I found this in my society garden and it struck me that humanity has yet to learn this subtle art of coexistence. Aphids, seen here in plenty, stick to stems, sucking sap or chew on leaves. They are food themselves for many bugs and worms. But the ants guard and protect the aphids. In return aphids provide ants with honey dew, a syrupy secretion from their body. The two co-inhabit the space. An ecological concept with deep implications for man.



Colourful Spectrum

Kushagra Singh Bhandari, Student, Springdales School, Dhaula Kuan, New Delhi

Over 4.5 billion years old! Earth, Gaia or Terra still remains the only habitable planet in the Goldilocks zone. Our dwarf has harboured a 107 billion lives and that's just humans apart from the insurmountable known & unknown species that she's provided for across centuries. The only nurturing & giving planet sustains abundant resources and wanting more will never satisfy the needs! So please be a benevolent & respectful borrower as it still stays 4.24 light years away from the closest exoplanet. Thus, from the eyes of the photographer, these pictures define a cinematic view of our star, planet and it's siblings orbiting around their axis from a far galactic distance.



Dazzling Dragonflies: Ecosystem's Unsung Hero

Snehal Jamalpure, PhD student, Agharkar Research Institute, Pune

Dragonflies are the harbingers of summer, gently poised on a branch or fluttering over a pond. As children, we remember picturing them as small flying helicopters with gleaming green luster. In our technologically evolved era, we lose sight of these species & devalue them. They lay eggs in pure water bodies. Hence, are reliable ecological indicators as their presence signals fresh water. It has significant impact on mosquito population as it voraciously feeds on them. In our pursuit of learning more about science, let's understand the value of beautiful dragonflies in our ecosystem.



Never ending

Tanuj S G, Student, Chinmaya Vidyalaya, New Delhi

This picture depicts how trees can respond to the change of season by losing their leaves, flowering, or breaking dormancy. This particular photo captures how a tree has sensed the change in season and has completely dropped all of its leaves waiting for the next season to begin. This is a Never Ending cycle of transformation a tree goes through its life, always keeping us thinking how science behind the change in season and the adaptability of a tree are intertwined in nature.

Foundation for Advancing Science and Technology (FAST India), is a not-for-profit institution committed to enabling the transformation of India's science and technology (S&T) ecosystem through policy and research, government support, institutional strengthening, corporate sector engagement, and science communication.

India Science Festival (ISF) is the flagship event of FAST India that is designed to provide a vibrant and stimulating platform to celebrate and explore science in all its facets. It connects young people and the general public with scientists, engineers, health professionals, business leaders, innovators, and creative professionals to foster public understanding of and engagement with science and bring together various actors in the science, technology and innovation ecosystem to discuss, collaborate and progress together.

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