{ BLIP TRACK } A TIMELINE

We scan and we will

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What does it look like, our history of trying to find alien life? How far back does it go?

1899: Strange, repeating beeps

Nikola Tesla, the Serbian-American innovator who helped advance radio communication and the adoption of electricity, is tinkering with a radio-wave receptor when he picks up strange repeating beeps. He thinks they are from aliens attempting to reach us. It turns out they're just cosmic noise; chirps from the magnetic fields disturbed by large planets in our solar system.

Already, though, the idea that we might someday "meet the neighbours" is generating excitement.

1924: America's "Big Listen"

The eccentric astronomer David Todd convinces the US Navy to help him listen for signals from our nearest neighbour, Mars. As its orbit swings it closer to Earth than it has been in 120 years, the Navy orders a National Radio Silence period. For five minutes every hour, from August 21 to 24, Americans turn off their radios so instruments can listen for alien signals. There are, of course, no messages. But excitement about explorations off-planet is growing.

1958: One small step...

NASA, which will go on to perform giant leaps for mankind, is set up.

1960: SETI

The non-profit Search for Extra-Terrestrial Intelligence is launched in 1960, by Cornell University astronomer Frank Drake. He uses radio telescopes to scan the stars for artificial signals. By 1984, the SETI Institute is set up. It continues to run listening programmes and collate data from citizen-science efforts.

2014: Lower than Gravity

The Indian Space Research Organisation's Mars Orbiter Mission makes it into the Red Planet's orbit, on a budget ($74 million) famously lower than that of the 2013 film Gravity.

2018: An asteroid grab

Japan's space agency, JAXA, launches Hayabusa2, which lands on the asteroid Ryugu, millions of km away, in 2018, after a journey of four years. It scoops up bits of rock and flies them home. The dark rock is found to hold evidence of liquid water, and organic molecules such as amino acids and hydrocarbons.

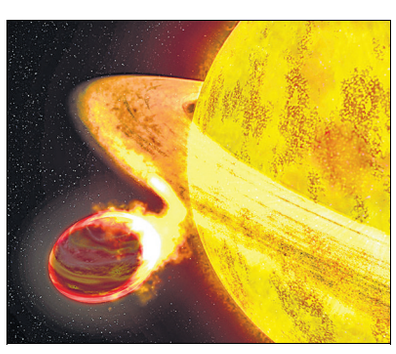
What else has our search involved? Scan the QR code for the full timeline.

READ the full timeline of our efforts to find signs of other life in the universe

189733 b sits 64 light years away and looks quite Earth-like. Discovered in 2005, it is anything but. The planet's **cobalt hue (right)** comes from an atmosphere so hot, it has turned the silica in its air into glass. The clouds here are laced with shards, so is the rain. Howling winds send this rain flying sideways, or whips it into tornadoes.

Some of the planets we have found hint at our own distant future, in evocative ways.

- **The ancient giant:** PSR B1620−26 b has been nicknamed Methuselah because it is one of the oldest planets ever discovered. Formed about 12 billion years ago (Earth is just over 4.5 billion years old), it orbits two burnt-out stars. It was discovered in 2003.



- **The little snack: WASP-12 b (below)** is being consumed by its star, WASP-12. The planet orbits so close to its sun, the pressure on it so great, that it has developed a comet-like tail, and a somewhat egg-like shape.

- **Stripped bare:** TOI-849 b has had its atmosphere so blasted by the radiation from its star that only the naked core of this gas giant remains. The planet was discovered in 2020 and is 730 light years away.

About the images shown here...

Most of the images NASA releases, of planets, stars and galaxies, are not of course photographs (captured in real time by a lens, as the term "photography" is understood here on Earth).

What they are is a translation of light signatures, because most of what our instruments capture, when it comes to the cosmos, consists of readings relayed as light. How far is a planet, how dense is its star, what colours would it exhibit to the human eye... such questions are answered by studying the light that makes its way from it to the various lenses we have deployed.

In order to use this data to render scientifically accurate images, NASA works with the Infrared Processing and Analysis Center (IPAC) set up and run jointly with the California Institute of Technology (CalTech).

culture

Tide and prejudice

Tidal flooding is getting worse, and disrupting homes and lives across Kerala's coastal villages. A new play invites villagers to stand on an inundated stage and tell their stories

Sailaja Jayanthan, a daily-wage labourer, holds up a jar from her kitchen as she talks about the damage done to her home. The play ends with the traditional theatrical character of the king (played by Albert Maliyekkal) performing to exhaustion on the stage.

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What does it look like, a prayer for the drowning?

On a stage in Kochi, it is a wooden frame built to replicate a coastal home. Within the frame, Vilasini Surendran, 64, a daily-wage labourer from Ernakulam, performs in ankle-deep water. She isn't acting, really; she is narrating the story of her life.

She speaks of 43 years of learning to "resurface". Of losing objects, a home, a sense of self and place.

The routine inundation is a natural disaster, she says, but it isn't considered one. It is called tidal flooding. Amid the climate crisis, as sea levels rise and storms intensify, the flooding has worsened.

Along India's extensive coastal and estuarine regions, residents (fisherfolk, policemen, farmers, shopkeepers, daily wage earners and a host of others) are watching from the margins, anxious and alone.

There is little to no government response; no mitigative measures are being discussed here.

In Kochi, as a call to action, an ancient ritual is being played out on an urban stage.

The play is titled Chevittorma, Malayalam for Prayer for the Dying. The name comes from a local Catholic ritual in which loved ones whisper prayers into the ear of a person on their deathbed, to comfort them.

"These villages are dying. Chevittorma is also a prayer for these villages," says director Sreejith Ramanan, roped in by the local climate-tech start-up Equinoct to stage the production (more on that in a bit).

The play has been staged across Kerala, and in Delhi and Mumbai. Later this month, it will be performed again in Kochi and in Thrissur.

Surge rates

How did all this come about?

It began with a data-gathering effort, says KG Sreeja, director of research at Equinoct.

Across estuarine belts, such flooding now occurs long after the monsoon, late into November and December. Sunny-day flooding, it is locally called.

(Kerala is not alone in this, of course; large parts of coastal India, from Mumbai to Kolkata and the Sundarbans are now home to such neighbourhoods.)

"Because the rising tides are silent and gradual, they don't have the dramatic impact of a cloudburst, hurricane or other such disaster," Sreeja says. Hence the play.

The effort began in 2020, when Jayaraman Chillayill, co-founder and managing director of Equinoct, began to work with journalist KPM Basheer and researcher Manjula Bharati to build a repository of data on tidal flooding in Ernakulam.

They began by sitting down with two panchayats, and ended up talking to people from across 20 villages.

"There were no real statistics available. Nobody really knew how many houses were affected," Chillayill says. "So we devised a calendar, distributed it across 10,000 households, and asked residents to note down the time, water levels and the number of times water entered their homes."

Data came back from 10,000 households across 15 villages.

Water levels were causing walls to crack and foundations to sink; utensils were being washed away; sickness and skin rashes were reported; homes were abandoned for a time.

The team decided to tell this story through an experimental play that featured members of the community. Bharati invited theatre director Ramanan to helm the effort. He began by sending video artist Akarsh Karunakaranan and production assistant Vipin Kumar VU to tour the villages, over a week. They returned with local history, myths, songs and rituals.

Cross currents

Chevittorma plays out on a stage erected within a tank of water.

After a brief history of the region, projected onto garments on a clothesline, items chosen from the actors' homes are beamed onto the screen, and the 12 villagers take turns to speak about them. The objects include a water-stained suitcase, a frayed notebook, kitchen utensils, worn toys and, in one instance, a precious flute.

Latha Dileep, 47, another daily-wage labourer, says she wouldn't be able to play her role if it required her to act.

"I don't think I have the talent. We are talking about our lives, just as they are. That is not acting," she says.

Meanwhile, the scientists continue their research into the tidal flooding, gathering data on its changing nature and its fallout.

"I think all researchers need to move beyond the shackles of data," Sreeja says. "As much as we talk about the necessity of it, it is only when one realises there is something beyond that data that one can realise the fullest power of the data itself."

WATCH a clip from the play Chevittorma

{ DEE FOR DRAMA }

Deepanjana Pal

Are you seeing what I'm seeing?

It's surprising that both Homebound and Kantara: Chapter 1 wallow in cliches of India, rather than reinventing them

Homebound, starring Ishaan Khatter and Vishal Jethwa as the friends Shoaib and Chandan, is earnest and evocative. But why are poverty and marginalisation the two men's only identity?

When Indiana Jones and the Temple of Doom (1984) was attacked for its depiction of India, director Steven Spielberg likely felt blindsided. Yes, he had shown this as a place where chilled monkey brains were considered fit for a banquet. But he was hardly the first filmmaker to exoticise India.

The late Amrish Puri, who played the villain Mola Ram, stood by the film. In his autobiography, The Act of Life (2006), he wrote: "We do this to ourselves in our own films. It's only when some foreign directors do it that we start cribbing."

I was reminded of this while watching Kantara: Chapter 1, written, directed by and starring Rishab Shetty. Set in a mythical past, it is lavishly produced.

Yet, cliches abound in this prequel to the refreshingly inventive Kantara (2022). India is a land of tigers and miracles. The king is stereotypically villainous. The forest-dwellers are primitive innocents. One marvels at stitched clothing. The protagonist Berme (Shetty) feels like a reimagining of Rudyard Kipling's Mowgli. How should we respond to an Indian perpetuating biases such as colourism, rewriting folklore to suit the dominant Hindu perspective, and othering local communities by exoticising them?

Mystic India isn't the only cliche that haunts us. When depicting modern India, the colonial Western gaze invariably depicted poverty, victimhood and squalor. As Indian filmmakers experimented with social realism, a debate began over whether they were capitalising on the suffering of the disenfranchised. The term "poverty porn" came to be attached to such films.

Neeraj Ghaywan's Homebound feels, surprisingly, like an extension of such narratives. His earnestness makes it easy to sympathise with his protagonists, long-time friends Shoaib (Ishaan Khatter) and Chandan (Vishal Jethwa), but sadly this is no Masaan (2015; the Cannes Award-winning tale of love in a prejudice-ridden India).

Shoaib is a patriotic Muslim who has refused a job in Dubai and hopes to make it into the police force. Chandan is a Dalit who checks off General Category when filling out application forms. Both are poor and want to be seen as more than their marginalised identities. Yet there is barely a moment when the audience, or the two men, are allowed to set aside these aspects of their identity.

Homebound's commitment to depicting the lived experience of India's minorities is commendable. But with its golden light, photogenic poverty and relentless misfortune, it also echoes uncomfortable stereotypes.

These cliches aren't fiction, but they are half-truths. Neither Kantara: Chapter 1 nor Homebound is able to reclaim the constructs of exotic India and reinvent them. Instead, Shetty and Ghaywan end up adding credence to cliches that make India seem like less than the sum of its many and diverse parts.

From the directors of Kantara and Masaan, I expected more and better.

(To reach Deepanjana Pal with feedback, write to @dpanjana on Instagram. The views expressed are personal)

{ MIRROR WORLDS } SCI-FI COME TO LIFE

Talking about a revolution

Astrophysicists are uncovering planets that echo worlds from the works of James Cameron, Andy Weir and George Lucas. Take a look.

The multi-star system: Alpha Centauri

James Cameron's Avatar (2009) is set on Pandora, a lush, habitable and fictional moon that orbits a gas giant in the very real Alpha Centauri A, which is part of a triple-star system 4.3 light years away from Earth. This August, NASA astronomers peering through the James Webb Space Telescope found that a gas giant about the size of Saturn does indeed orbit Alpha Centauri A.

Because of its proximity, and the fact that we recognised it as a binary star system as far back as the 1600s, Alpha Centauri has featured prominently in science-fiction.

In Isaac Asimov short stories of the 1940s, humans use hyperspace or faster-than-light travel to get to Alpha Centauri. In The Hitchhiker's Guide to the Galaxy (1979), an intergalactic bureaucratic office is stationed there.

The star system also forms the battleground in the critically acclaimed strategy video game, Sid Meier's Alpha Centauri (1999).

Ancient sun: Tau Ceti

Just under 12 light years away, Tau Ceti is about twice as old as our Sun, and only a bit smaller. Known to astronomers for centuries, it features in Larry Niven's A Gift from Earth (1968), in which advanced colonies take root on planets circling this sun.

In Kim Stanley Robinson's Aurora (2015), a generation ship makes its way to a new world, a moon orbiting one of the planets in Tau Ceti's system.

In Andy Weir's Project Hail Mary (2021), this star system holds the key to solving an extinction-level solar dimming event threatening Earth.

Astronomers have so far detected four possible planets around Tau Ceti, with no confirmed moons.

A real-world Vulcan?

A triple-star system about 16 light-years away consists of the white dwarf 40 Eridani B, the red dwarf 40 Eridani C and 40 Eridani A, a star that is smaller, cooler and half as luminous as our Sun.

In fiction, Vulcan, the home of the Star Trek hero Commander Spock, orbits one of the three stars. In 2018, Trekkies celebrated when a planet much like Vulcan was indeed found to be orbiting 40 Eridani A.

Last year, further investigation revealed that the planet had merely been an astronomical illusion, caused by the pulses and jitters of the star itself.

A shining newcomer: Epsilon Eridani

This orange star about 10 light years away stars in the 1994 space opera Babylon 5, set aboard a space station. It has also featured in game franchises such as Halo (2001), in which humans have colonised its fictional planet, Reach.

Sky with two suns: Kepler-16 b

In George Lucas's Star Wars universe, the desert planet Tatooine, with its burnt-orange sky, serves as a vital epicentre. The home of the young Jedi Luke Skywalker, it circles two suns, Tatoo I and Tatoo II, as first depicted in 1977, in Star Wars: Episode IV – A New Hope.

In 2011 NASA's Kepler mission found a planet where two suns set on the horizon, Kepler-16 b, 245 light years from Earth. Unlike Tatooine, it is cold, gaseous and unlikely to harbour any kind of life.

BY ANESHA GEORGE