

SCIENCE CENTRE NEWS LETTER

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SCIENCE CENTRE

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WHAT'S NEW IN SCIENCE?

NASA's snake-like robot could look for life on an icy Saturn moon.

A slithering serpent, like robot could explore extreme terrain in icy moons like Enceladus [it is the sixth (6th) largest moon of planet Saturn] at planet Saturn, according to Researchers from NASA's Jet Propulsion Laboratory (JPL) in California. Enceladus is famous for spouting water through its icy crust, and is one of the top spots to search for life in the solar system.

To navigate the crumpled moon's surface, the Exobiology Extant Life Surveyor (EELS) is designed to use several rotating segments connected in a series, to twist and bend itself like a snake across terrain. The rotating segments on EELS are wrapped in screw threads, which it uses to propel itself over a variety of surfaces.

EELS' snake-like ability to move those segments independently allows the robot to exert pressure against the confines of tight spaces, to climb or descend areas conventional equipment would be incapable of reaching.

The robot has 10 rotating segments, propelled by wider, 8-inch (20-centimeter) plastic screws for testing over looser terrain, and sharper metal screws for gaining traction in icy conditions. The Researchers tested EELS



in several challenging environments like an ice rink, the sandy Mars Yard at JPL used for rover training and even a "robot playground" setup at a ski resort in southern California.

The robot's head will feature cameras and LiDAR (Light Detection and Ranging) to help EELS analyze and traverse different environments, part of which involves creating 3D maps of its surroundings. To test this, EELS researchers lowered a prototype of the snake-robot's head into a glacial crack not dissimilar to one EELS might encounter on one of its primary targets: Saturn's moon Enceladus.

Enceladus is an icy moon orbiting our solar system's most prominently-ringed planet, Saturn. Its surface is covered in long cracks known as tiger stripes, which spew jets of water from oceans beneath the miles-thick ice. NASA measurements have detected large amounts of organic material within this water jets. Enceladus is a major contender amongst planetary bodies in our solar system capable of supporting life.

Courtesy - Jeevan Bharti Atal Tinkering Lab, Pravruti vidhyalaya

SCIENTIST OF THE MONTH

Shanti Pavan

Yendluri Shanti Pavan was born on 1st June 1973 in India. He did graduate studies in Electronics and Communication Engineering from the Indian Institute of Technology (IIT), Madras, B.Tech from IIT in 1995 and moved to the U.S (United States) to pursue higher studies. He secured a master's degree in 1997 and Ph.D in 1999 from Columbia University, New York, U.S. He has done post doctoral studies from Texas Instruments at Warren Centre, New York. There he worked on high speed analog filters and data converters. In 2000, he had worked on microwaves ICs (Integrated Circuits) for data communication at Big Bear Network, Sunnyvale, California, U.S. Later, he concentrated on analog mixed signal VLSI



(Very- Large Scale Integration) circuits [it is the process of creating Integrated Circuits (IC) by combining millions of MOS transistor (Metal-Oxide Semiconductor) on to a single chip] and since

developed many designs of core components of electronic system.

Returning to India in 2002, he joined IIT, Madras as a faculty member and served as a Professor at Department of Electrical Engineering.

Shanti Pavan received the Young Engineer award of Indian National Academy of engineering in 2006. The

Council of Scientific and Industrial Research awarded him Shanti Swarup Bhatnagar Prize in 2012. He was elected as IEEE, New York (Institute of Electrical and Electronics Engineers) fellow in 2018 for his contribution to Delta- Sigma Modulators and analog filters.

Courtesy - Jeevan Bharti Atal Tinkering Lab, Pravruti vidhyalaya

SCIENCE FACTS JUNE 2023



Timings

Tuesday to Sunday
& Public Holidays
9.30 am to 4.30 pm

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1 June 1833	James Clark Ross discovers the position of the North Magnetic Pole on the Boothia Peninsula.
1 June 1917	American Chemist William S. Knowles (Co- winner of the 2001 Nobel Prize in Chemistry for his work in asymmetric synthesis, specially in hydrogenation reactions.) was born.
2 June 1896	Guglielmo Marconi receives a patent for his newest invention : the radio.
4 June 1877	German Biochemist Heinrich Wieland (made research into the bile acids) was born.
5 June	"World Environment Day"
5 June 1900	Hungarian Physicist Dennis Gabor (inventor of holography) was born.
6 June 2012	The astronomical event "Transit of Venus" happened on this day.
7 June 1862	Austrian Physicist Philipp Lenard (worked on cathode rays and the discoveries of many of their properties) was born.
7 June 1896	American Physical Chemist Robert S. Mulliken (responsible for the early development of molecular orbital theory) was born.
7 June 1979	India Launched first low orbit Earth observation Satellite - "Bhaskar" into the Space.
8 June	"World Brain Tumour day"
8 June 1916	English Molecular Biologist Francis Crick (played crucial roles in deciphering in helical structure of the DNA molecule) was born.
11 June 1963	First Lady Astronomer "Valentina " came back from journey to Space.
12 June	"World Day against child labour"
12 June 1899	American Biochemist Fritz Albert Lipmann (co- discoverer of coenzyme A) was born.
13 June 1831	Scottish Physicist James Clerk Maxwell was born.
13 June 1911	American Physicist Luis Alvarez (Awarded the Nobel Prize in Physics in 1968 for his discovery of resonance states in particle physics using the hydrogen bubble chamber) was born.
13 June 1983	Pioneer 10 becomes the first manmade object to leave the Solar System.
14 June	World Blood Donor Day (WHO)
15 June 1917	American Chemist John Fenn (worked in mass spectrography) was born.
16 June 1897	German Chemist Georg Witting (reported the method of synthesis of alkenes from aldehydes and ketones using compounds called phosphonium ylides) was born.
18 June 1918	American Chemist Jerome Karle (Awarded the Nobel Prize in Chemistry in 1985 for the direct analysis of crystal structures using X-ray scattering techniques) was born.
18 June 2023	The third Sunday of June is celebrated as " International father's Day"
19 June	World Sickle cell Anaemia Awareness Day
19 June 1623	French mathematician Blaise Pascal was born.
19 June 1897	English Chemist Cyril Norman Hinshelwood (Expert in chemical kinetics) was born.
20 June 1877	Alexander Graham Bell installs world's first commercial telephone service in Hamilton, Ontario, Canada.
22 June 1973	Successful landing of the astronomer of Skylab in Pacific Ocean after revolving around the earth for 28 days.
22 June 2006	The newly discovered moons of Pluto are officially named Hydra and Nix by the international Astronomical Union.
23 June	United Nations Public Service Day (UN)
30 June 1880	Longest total Solar Eclipse of millennium
U. N. : United Nations WHO : World Health Organization	

SCIENTIFIC QUESTION

What is Malaria?

Malaria is a disease caused by a parasite. The parasite is spread to humans through the bites of infected mosquitoes. People who have malaria usually feel very sick with a high fever and shaking chills.

To reduce malaria infections, World Health Organization(WHO) distribute preventive drugs and insecticide-treated bed nets to protect people from mosquito bites.

Symptoms: Signs and symptoms of malaria may include:

- Fever
- Chills
- General feeling of discomfort
- Headache
- Nausea and vomiting
- Diarrhea
- Abdominal pain
- Muscle or joint pain
- Fatigue
- Rapid breathing
- Rapid heart rate
- Cough

Some people who have malaria experience cycles of malaria "attacks". An attack usually starts with shivering and chills, followed by a high fever, sweating and a return to normal temperature of body. Malaria signs and symptoms typically begin within a few weeks after being bitten by an infected mosquito.

Causes: Malaria is caused by a single-celled parasite of the genus plasmodium. The parasite is transmitted to humans most commonly through mosquito bites.

Mosquito transmission cycle

•**Uninfected mosquito:** A mosquito becomes infected by feeding on a person who has malaria and can spread malaria parasites to the other person when it bites.

•**Transmission of parasite:** If this mosquito bites in the future, it can transmit malaria parasites to body.

•**In the liver:** Once the parasites enter your body, they travel to your liver - where as some types of parasites can lie

dormant for as long as a year.

•**Into the bloodstream:** When the parasites mature, they leave the liver and infect red blood cells. This is when malaria symptoms developed.

•**Risk factors:** The degree of risk depends on local malaria control, seasonal changes in malaria rates and the precautions you take to prevent mosquito bites.

•**Complications:** Malaria can be fatal. Malaria deaths are usually related to one or more serious complications, including the following:

•**Cerebral malaria:** If parasite-filled blood cells block small blood vessels to brain, swelling of brain or brain damage may occur. Cerebral malaria may cause seizures (it is a sudden, uncontrolled burst of electrical activity in the brain) and coma.

•**Breathing problems:** Accumulated fluid in lungs (pulmonary edema) can make it difficult to breathe.

•**Organ failure:** Malaria can damage the kidneys or liver or cause the spleen to rupture. Any of these conditions can be threatening.

•**Anemia:** Malaria may result in not having enough red blood cells for an adequate supply of oxygen to your body's tissues.

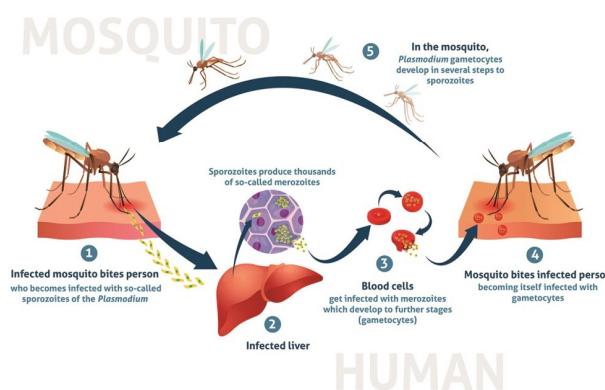
•**Low blood sugar:** Severe forms of malaria can cause low blood sugar (hypoglycemia), as can quinine - a common medication used to combat malaria. Very low blood sugar can result in coma or death.

•**Prevention:** If you live in or travelling to an area where malaria is common, take steps to avoid mosquito bites. To protect yourself from mosquito bites, you should wear long sleeved clothes and pants to cover the skin, apply insect repellent to skin and clothing and sleep under a net.

•**Diagnosis:** To diagnose malaria, Doctor will likely review medical history and recent travel, conduct a physical exam and further, he can prescribe the following blood tests:

- The presence of the parasite in the blood, to confirm that person has malaria or not.
- Which type of malaria parasite is causing person's symptoms.
- If infection is caused by a parasite resistant to certain drugs.
- Whether the disease is causing any serious complications?

•**Treatment:** Malaria is treated with prescription drugs to kill the parasite. The most common anti-malarial drugs include Chloroquine Phosphate and Artemisinin-based combination therapies (ACTs).



KNOW THE EXHIBIT

Health in Space – Alzheimer's disease

Radiation in space might harm the brains of astronauts in deep space by accelerating the development of Alzheimer's disease, which typically involves progressive mental decline over several years.

“A study shows for the first time that exposure to radiation levels equivalent to a mission to Mars could produce cognitive problems and speed up changes in the brain that are associated with Alzheimer's disease”, study author Kerry O' Banion, a Neuroscientist at the University of Rochester Medical Centre, said in a statement.

Space is filled with radiation that can harm people. Earth's magnetic field generally protects the Earth, once Astronauts venture beyond Low-Earth Orbit, they are constantly bombarded by a shower of dangerous particles known as cosmic rays. The longer an Astronaut is in deep space, the greater the risk.

Now, Scientists have for the first time examined the effects space radiation might have on Neurodegeneration - in particular, the biological processes in the brain linked with the development of Alzheimer's disease, which typically involves progressive mental decline over several years. They found galactic cosmic radiation poses a significant threat to future Astronauts.

This exhibit is situated at “Entering Space Gallery” between Fun Science Gallery and Power of Play Gallery at the first floor of Science Centre.



LUNAR ECLIPSE

Science Centre Surat had organized Astronomical Phenomena Lunar Eclipse through the telescope for Surat's citizens on 05/05/2023 from 8:40pm to 11:00pm. Earth is rotating around the Sun and Moon is rotating around the Earth. In such motion, sometimes Sun, Earth and Moon are come in a straight line. There fore, the Solar Eclipse and the Lunar Eclipse occur. This was the first Lunar Eclipse of the year. 371 people witnessed the event.



Summer Camp May-2023

Science Centre Surat had organized 'Summer Camp' at the first floor of Museum from 10th to 20th May 2023. Students had learnt about Craft, Astronomy, Science and Robotics. In this Summer Camp two groups were made according to the age. Group 'A' was for children of the age group 7 to 12 years and Group 'B' was for 13 to 17 years. Total 94 students had participated in the summer camp.



Zero Shadow Day

Zero Shadow Day is a celestial phenomenon that takes place twice a year near equator, between the Tropic of Cancer (+23.5 degrees latitude) and the Tropic of Capricorn (-23.5 degrees latitude). On that day (26th May 2023), the Sun passed over the head at 12:36 pm in Surat city. At that time, the shadow of object is in vertical direction thus one cannot see shadow of the object. Science Centre Surat had organized this event.

