

Human brain's vision map

NEARLY 100 years after a British neurologist first mapped the blind spots caused by missile wounds to the brains of soldiers, Perelman School of Medicine researchers at the University of Pennsylvania have perfected his map using modern-day technology. Their results create a map of vision in the brain based upon an individual's brain structure, even for people who cannot see. Their result can, among other things, guide efforts to restore vision using a neural prosthesis that stimulates the surface of the brain.

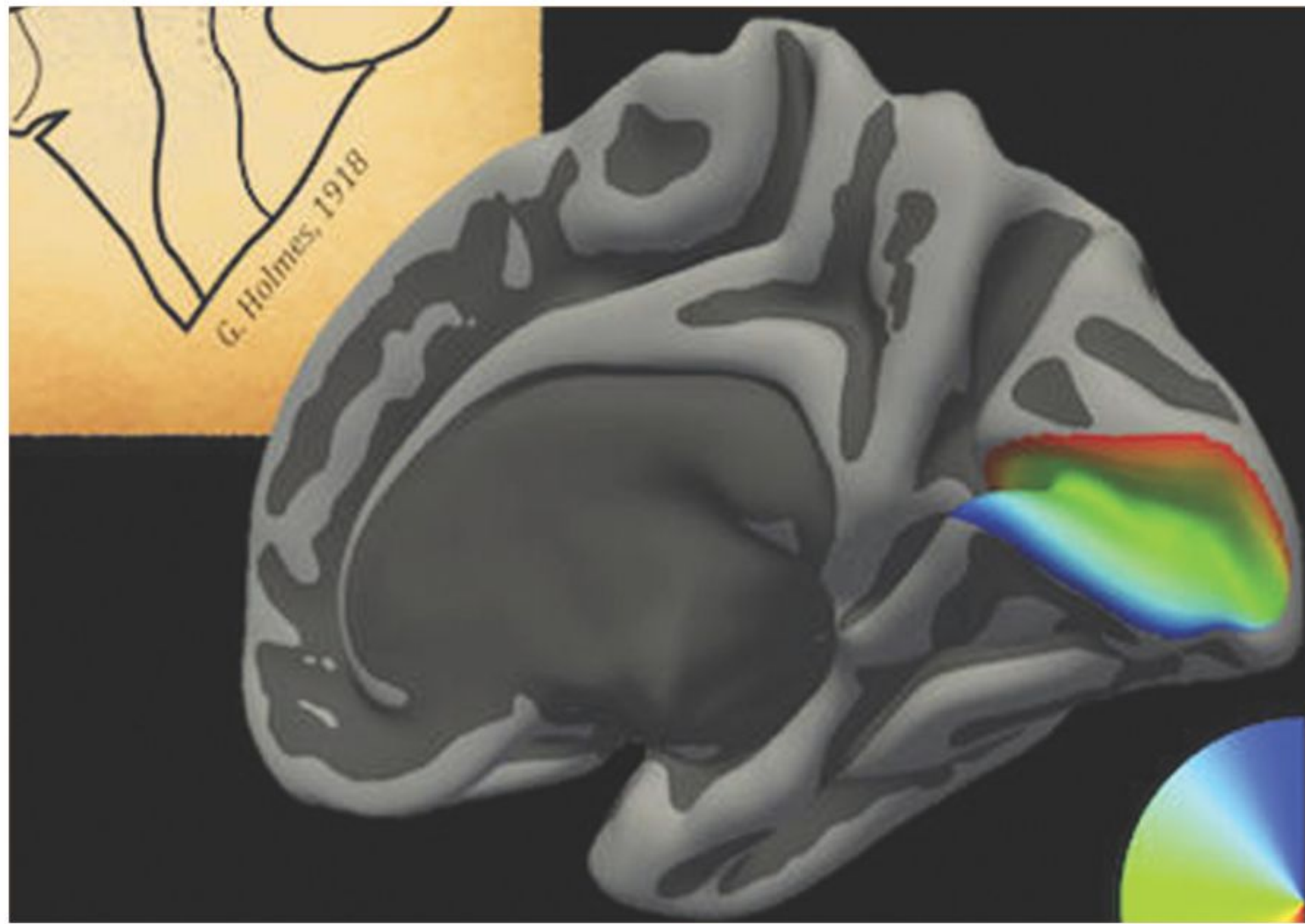
The study appears in the latest issue of *Current Biology*, a Cell Press journal.

Scientists frequently use a brain imaging technique called functional MRI (fMRI) to measure the seemingly unique activation map of vision on an individual's brain. This fMRI test requires staring at a flashing screen for many minutes while brain activity is measured, which is an impossibility for people blinded by eye disease. The Penn team has solved this problem by finding a common mathematical description across people of the relationship between visual function and brain anatomy.

"By measuring brain anatomy and applying an algorithm, we can now accurately predict how the visual world for an individual should be arranged on the surface of the brain," said senior author Geoffrey Aguirre, MD, PhD, assistant professor of Neurology. "We are already using this advance to study how vision loss changes the organization of the brain."

The researchers combined traditional fMRI measures of brain activity from 25 people with normal vision. They then identified a precise statistical relationship between the structure of the folds of the brain and the representation of the visual world.

"At first, it seems like the visual area of the brain has a different shape and size in every person," said co-lead author Noah Benson, PhD, post-doctoral researcher in Psychology and Neurology. "Building upon prior studies of regularities in brain anatomy, we found that these indi-



The modern map of the representation of vision in the brain is compared to the 1918 original.

vidual differences go away when examined with our mathematical template."

A World War I neurologist, Gordon Holmes, is generally credited with creating the first schematic of this relationship. "He produced a remarkably accurate map in 1918 with only the crudest of techniques," said co-lead author Omar Butt, MD/PhD candidate in the Perelman School of

Medicine at Penn. "We have now locked down the details, but it's taken 100 years and a lot of technology to get it right."

The research was funded by grants from the Pennsylvania State CURE fund and the National Institutes of Health.

Source: **Science Daily**



FLYMEAL

Food from insect

COMMON house flies (*Musca domestica*) may be a cheap and sustainable source of feed for farm animals, according to a scientist and an entrepreneur.

The flies, whose larvae can be bred, nurtured and ground into granules, provide roughly the same amount of edible protein as fish meal and other widely used protein sources, said entrepreneur Jason Drew.

Drew's book, *The Story of the Fly and How it Could Save the World*, launched in London, United Kingdom, last week, argues that the insect's larvae should be farmed commercially to provide protein for farmed fish and animals to feed the world's growing population.

Commercially bred flies can live on slaughterhouse or distillery waste, rather than on foods that could be processed and sold to humans, which also makes them environmentally sound, he said.

Drew and his brother David are breeding *M. domestica* to use in fish farms in their Cape Town business, AgriProtein.

Jason Drew told SciDev.Net that AgriProtein feeds its breeding stock waste human food, while the larvae produced consume slaughterhouse blood. It has taken five years to develop the larvae farming process. Around one million flies are kept in a cage of about 100 cubic metres producing about 1,000 eggs each.

The larvae are hatched and harvested within 17 days, which is how long they live before they turn into flies. They are then dried, flaked and sold as meal. Last month, the company produced 100 tonnes of wet larvae and 24.5 tonnes of feed, Drew told SciDev.Net.

AgriProtein is one of the first companies to produce high quantities of fly meal for commercial use, said Paul Vantomme, senior forestry officer for the UN Food and Agriculture Organization, in Rome.

Source: **SciDev.Net**



The common house fly may provide an excellent source of protein for farming.

LOST IN TIME

Frost-trapped mammoth



The carcass, discovered on Russia's Taimyr Peninsula, still has one of its tusks.

A well-preserved mammoth carcass has been found by an 11-year-old boy in the permafrost of northern Siberia. The remains were discovered at the end of August in Sopochynaya Karga, 3,500km (2,200 miles) northeast of Moscow.

A team of experts from St Petersburg then spent five days in September extracting the body from frozen mud. The mammoth is estimated to have been around 16 years old when it died; it stood 2m tall and weighed 500kg.

It has been named Zhenya, after Zhenya Salinder, the 11-year-old who found the carcass while walking his dogs in the area. Alexei Tikhonov, from the St Petersburg Zoology Institute, who led the team excavating the mammoth, said this specimen could either have been killed by Ice Age humans, or by a rival mammoth.

He added that it was well preserved for an adult specimen. His colleague Sergei Gorbunov, from the International Mammoth Committee, which works to recover and safeguard such remains, said: "We had to use both traditional instruments such as axes, picks, shovels as well as such devices as this 'steamer' which allowed us to thaw a thin layer of permafrost."

"Then we cleaned it off, and then we melted more of it. It took us a week to complete this task." But several juvenile examples have come to light that are more complete. Earlier this year, a very well preserved juvenile mammoth nicknamed Yuka was unveiled by scientists.

Source: **BBC News**

LOST

Gender bias in science

SHAMIMA K CHOUDHURY

RECENT advances in science and technology and a large number of scientists with a wide spectrum of skills, dedicated to new and innovative developments, have given a great hope for alleviation of hunger, poverty, malnutrition, unemployment and unhealthy living conditions of the teeming millions of the developing world. A productive life and a quality life for all irrespective of developed

or developing country is a rightful demand of this science and ICT century. For this purpose, women along with men should be given ample opportunities to enter and excel in science, technology, and related professions. While women constitute half of humanity, even in countries where they have ready access to higher education, the number of women studying mathematics, physical science, and engineering remains disproportionately below parity with that of men. Talented and capable women are practically turned away from these and other fields, and the few who persist typically find themselves isolated and marginalized. As a result, the overall participation of women scientists and engineers in the workforce continues to be very limited, and these professional women seldom reach the top of the hierarchy at universities, research organizations or



Research activities thrive in university laboratories today. Courtesy: Ekramul Kamal Ovi

policy making institutions in the government and the private sectors. Bangladesh is no exception in this regard.

Present status of women in science education

The development of a country is a continuous process and there is no easy formula for a magic transition. Men and Women must work hand in hand and must work hard. The status of women in science and education at the primary, secondary and higher levels in our country and ways and means of improving the methods of science education, status of women scientists in different sectors, their problems in career building in professional lives are prerequisites for improving the present situation. Overall a global comparison with our women in scientific profession has been included in the present study.

Bangladesh is a medium human developed country with HDI of 0.543.

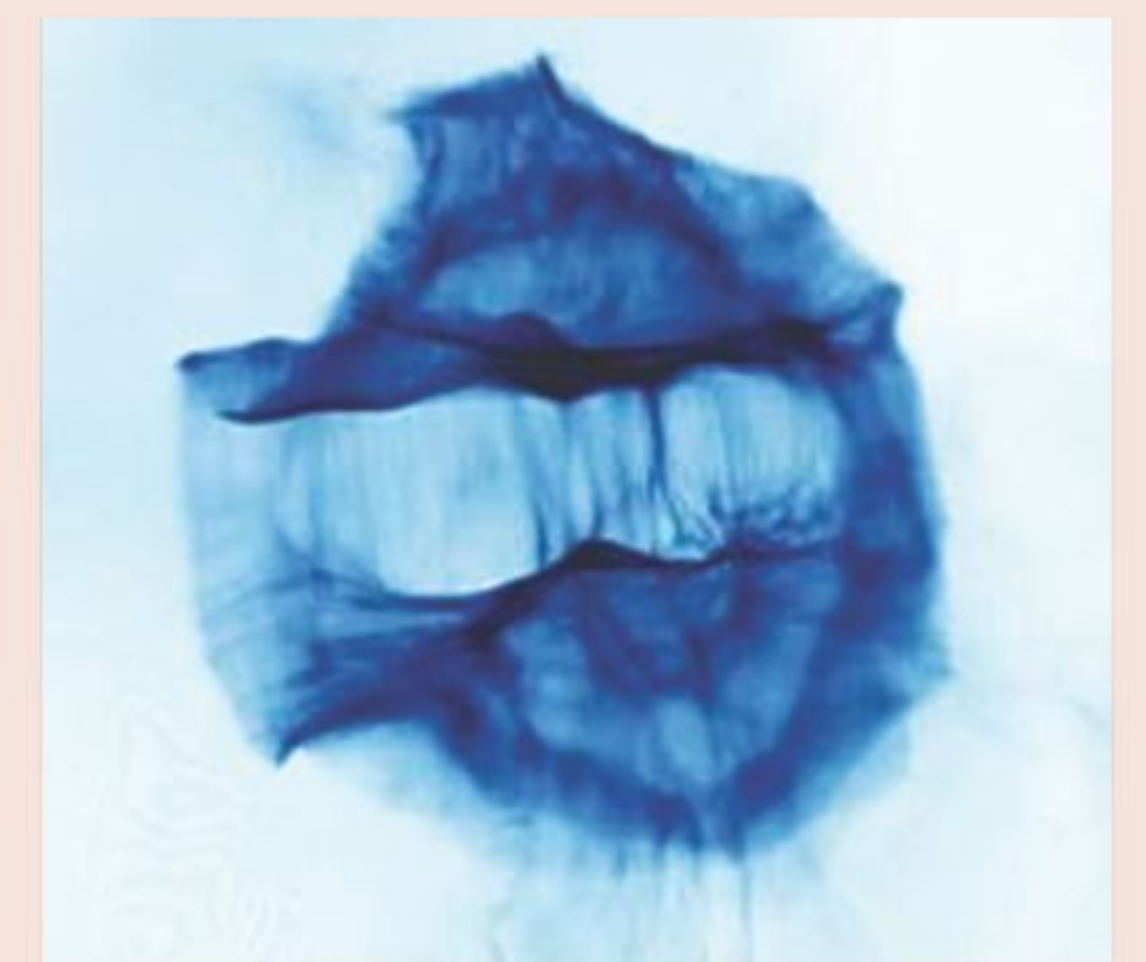
Compared to other developing countries it has a highly dense population with a low adult literacy rate (54%). Science education in general is less popular compared to business studies because of demand in job market. Women represent 48% of the total population. Percentage of women in science (30%) in Bangladesh is quite satisfactory and comparable with many of the developed countries.

Despite many disadvantages, women in Bangladesh are showing their excellence in many of the professional lives as scientists, engineers and medical professionals. Lower representation of women in academic faculty and scientific leadership positions in these fields and especially in policy making bodies of the government is a reality even though highly unjustified. The drive and motivation of women in science is demonstrated by those women who persist in academic careers despite all obstacles. Although women scientists and researchers are hardworking, creative with high intellectual capability but they are still underrepresented and discriminated in the policy making positions of scientific profession and education. However social, scientific and technological advancement of a nation can only be strengthened through equal participation of men and women.

The writer is Professor, Department of Physics, University of Dhaka

COUNTER-STREAM

Order out of chaos



Plasmas stream from the top and bottom to form large-scale electromagnetic fields.

ONE of the unsolved mysteries of contemporary science is how highly organized structures can emerge from the random motion of particles. This applies to many situations ranging from astrophysical objects that extend over millions of light years to the birth of life on Earth.

The surprising discovery of self-organized electromagnetic fields in counter-streaming ionized gases (also known as plasmas) will give scientists a new way to explore how order emerges from chaos in the cosmos. This breakthrough finding was published online in the journal, *Nature Physics* on Sept. 30.

"We've created a model for exploring how electromagnetic fields help organize ionized gas or plasma in astrophysical settings, such as in the plasma flows that emerge from young stars," said lead author Nathan Kugland, a postdoctoral researcher in the High Energy Density Science Group at Lawrence Livermore National Laboratory (LLNL). "These fields help shape the flows, and likely play a supporting role alongside gravity in the formation of solar systems, which can eventually lead to the creation of planets like the Earth."

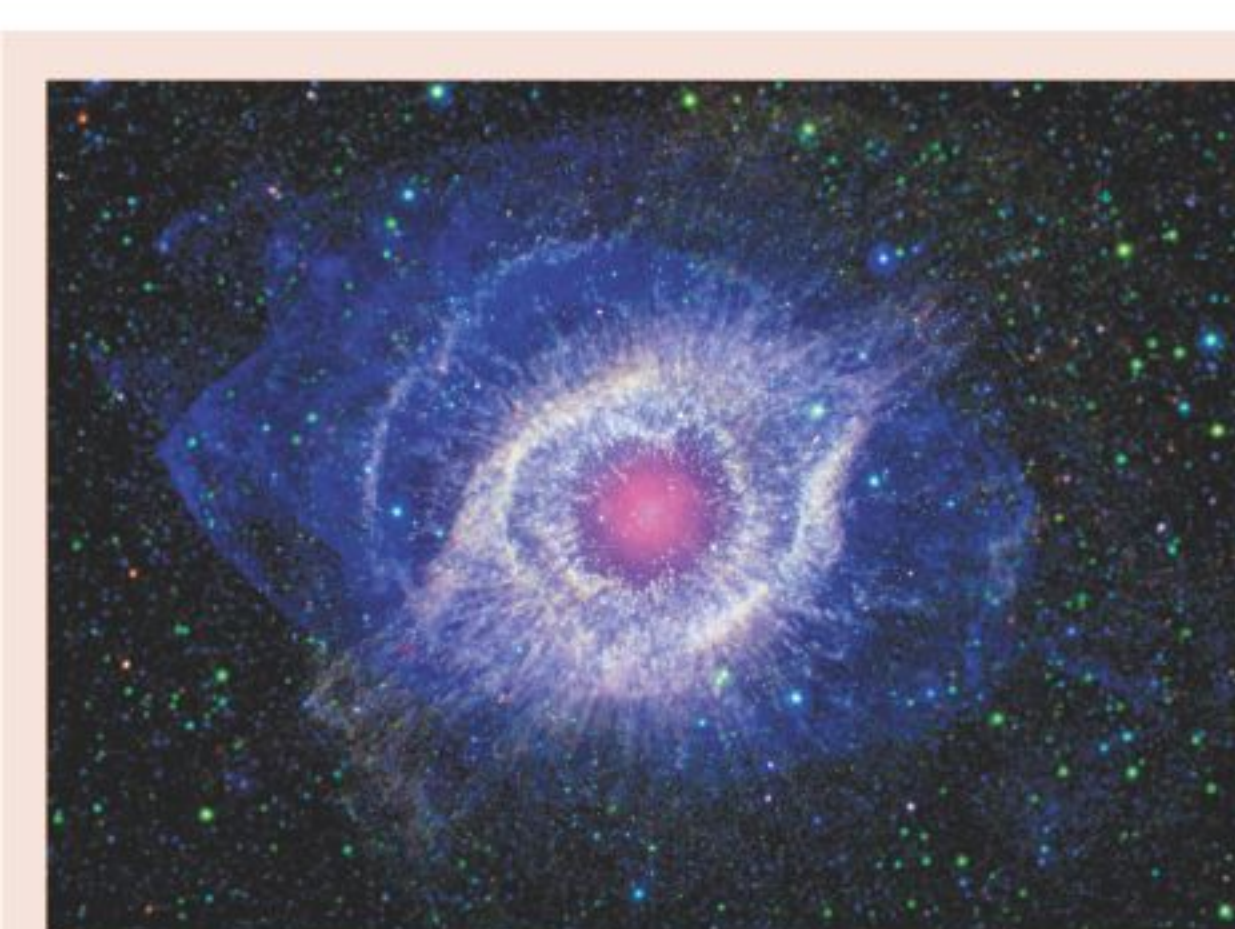
"This observation was completely unexpected, since the plasmas move so quickly that they should freely stream past each other," explained Hye-Sook Park, team leader and staff physicist at LLNL. Park added that "laser-driven plasma experiments can study the microphysics of plasma interaction and structure formation under controlled conditions."

Studying astrophysics with laboratory experiments can help answer questions about astrophysical objects that are far beyond the reach of direct measurements. This research is being carried out as part of a large international collaboration, Astrophysical Collisionless Shock Experiments with Lasers (ACSEL), led by LLNL, Princeton University, Osaka University and Oxford University, with many other universities participating.

This work was performed at the OMEGA EP laser by the Lawrence Livermore National Laboratory.

Source: **Science Daily**

SPACEEYE



This object, called the Helix nebula, lies 650 light-years away, in the constellation of Aquarius.

Star in death throes

A pair of NASA space telescopes have captured a spectacular new photo of the Helix Nebula, a glowing celestial vision that resembles a giant cosmic eye.

The Helix Nebula (also known as NGC 7293) represents a dying star known as a planetary nebula. The new picture, released Wednesday (Oct. 3), combines data from NASA's Spitzer Space Telescope, which observes in long-wavelength infrared light, and the Galaxy Evolution Explorer (GALEX), which picked out the short-wavelength ultraviolet light coming from the object.

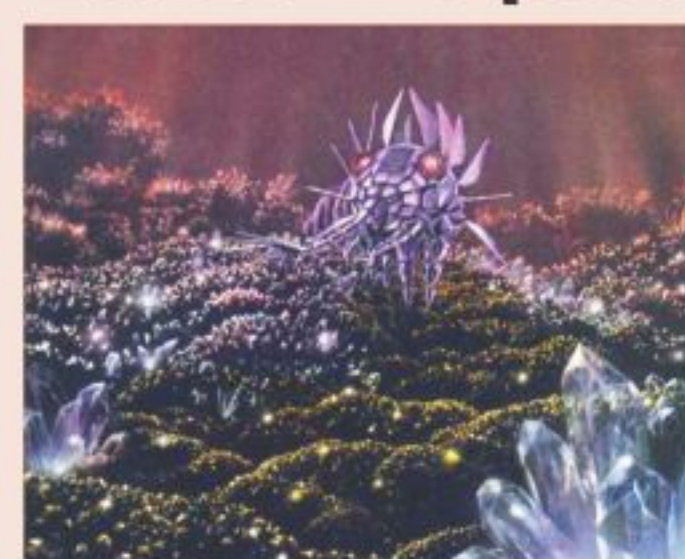
Source: **Live Science**

IS SILICON-BASED LIFE POSSIBLE?

Is silicon-based life possible?

Conceivably, some strange life-forms might be built from silicone-like substances were it not for an apparently fatal flaw in silicon's biological credentials. This is its powerful affinity for oxygen.

When carbon is oxidized during the respiratory process of a terrestrial organism, it becomes the gas carbon dioxide a waste material



Hypothetical silicon life might look like animated crystals.

that is easy for a creature to remove from its body. The oxidation of silicon, however, yields a solid because, immediately upon formation, silicon dioxide organizes itself into a lattice in which each silicon atom is surrounded by four oxygens. Disposing of such a substance would pose a major respiratory challenge.

Source: **Science Daily**