Ode to E Pluribus Unum for Sunday November 24 2024

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20 Breathtaking Astronomy Photos Capture the Best of Space

From galaxies to constellation rises, each visual is a treat for the eyes.

"Arctic Dragon" by Carina Letelier Baeza.
Credit: Carina Letelier Baeza

The Astronomy Photographer of the Year competition has returned, with its sixteenth edition shortlist featuring a stunning array of photographs.

London's Royal Museums Greenwich received a whopping 3,500 entries from both amateur and professional photographers globally, each of whom captured a breathtaking glimpse of space. The 30 shortlisted entries range from visuals from the Geminid meteor shower to an aurora in the shape of a dragon to ancient supernova remnants. Categories cover everything from stars and nebulae to asteroids to lunar and solar images.

https://bit.ly/4bqO2XP

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A Rock-Star Researcher Lies—and Nearly Got Away with It

Jonathan Pruitt was prolific, influential, and charming. Then academic sleuths started poking around

popsci

Researcher Jonathan Pruitt, a behavioral ecologist at McMaster University in Hamilton, Ontario. was a superstar in his field and, in 2018, was named a Canada 150 Research Chair, becoming one of the younger recipients of the prestigious federal one-time grant with funding of $350,000 per year for seven years. He amassed a huge number of publications, many with surprising and influential results. He turned out to be an equally prolific fraud.

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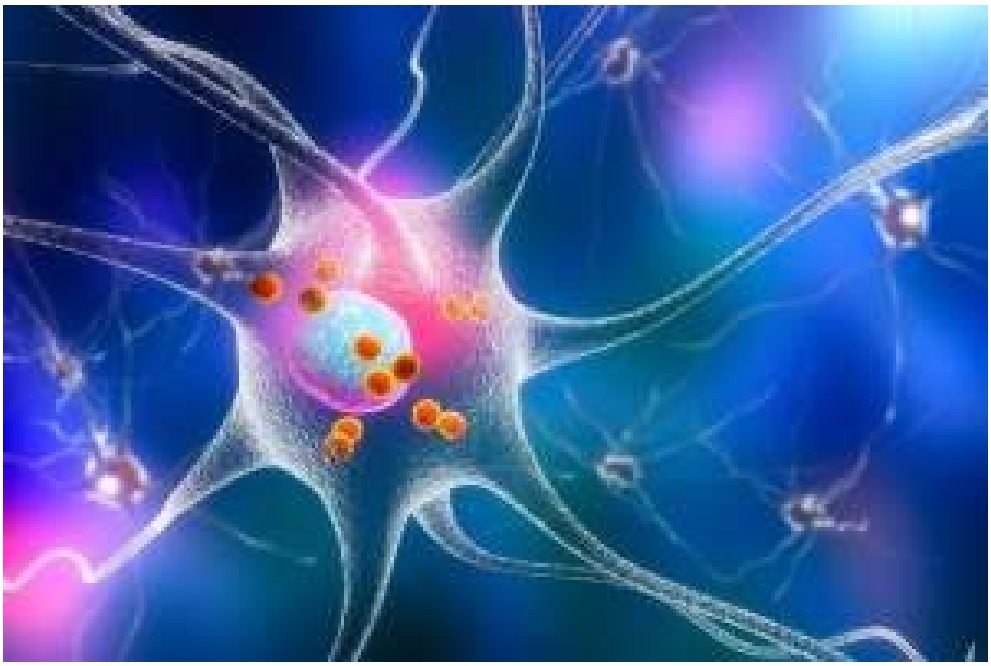
New Approach to Fight Huntington's Disease Shows Early Promise



Healthday

Huntington's disease is a devastating, fatal neurological illness with little means of treatment, but a new study in mice offers a glimmer of hope.

Huntington's occurs when inherited genes cause key proteins to fold and clump together within brain cells. Over time, this severely hampers brain function and patients lose the ability to talk, walk, swallow and focus. There's no cure, and the illness is typically fatal within a decade or two of symptom onset.

However, new research in mice is investigating the utility of "peptide-brush polymers" as treatment. The peptides involved in the therapy are naturally occurring proteins that may block the lethal clumping of Huntington's-associated proteins within brain cells.

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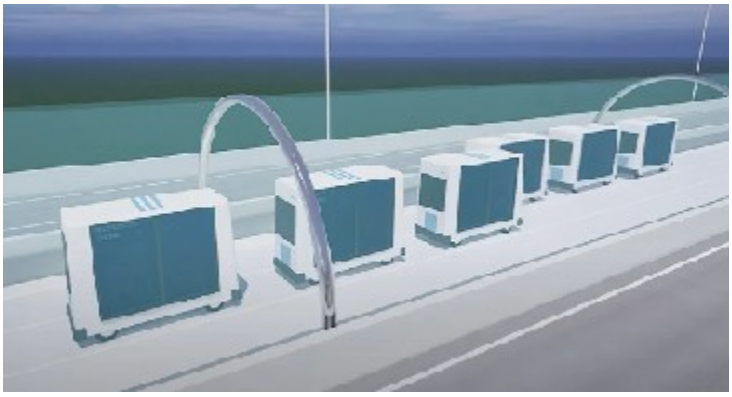
Japan Plans Automated Cargo Transport System

The plan is designed to relieve shortage of drivers and cut emissions.



Japan's Ministry of Land Infrastructure

Japan is planning to build an automated cargo transport corridor between Tokyo and Osaka, dubbed a "conveyor belt road" by the government, to make up for a shortage of truck drivers.

The amount of funding for the project is not yet set. But it's seen as one key way to help the country cope with soaring deliveries.

A computer graphics video made by the government shows big, wheeled boxes moving along a three-lane corridor, also called an "auto flow road," in the middle of a big highway. A trial system is due to start test runs in 2027 or early 2028, aiming for full operations by the mid-2030s.

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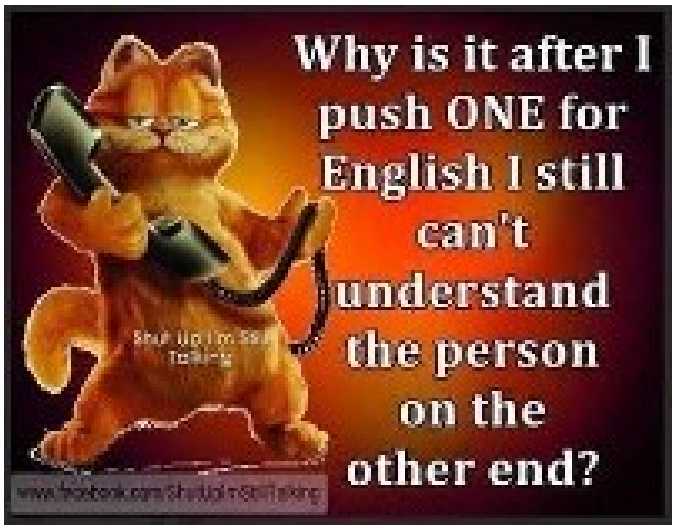

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Space Force Works To Get GPS Ground System Upgraded By 2025

The troubled OCX ground system to allow users access to the jam-resistant M-Code GPS signal will go into operational tests by the end of the year, and the Space Force also has shaken up its effort to field M-Code radios and receivers, said Cordell DeLaPena, who heads those programs for Space Systems Command.

Spc. Caleb Green of 2nd Battalion, 13th Field Artillery Regiment, 1st Stryker Brigade Combat Team, 4th Infantry Division, prepares for his nightly call-for-fire mission with the Long Range Advanced Scout Surveillance System (LRAS) mounted on top.
(Photo: Gregory Dalglish, Test Officer, Intelligence Electronic Warfare Test Directorate)

The Space Force is pushing hard to wrap up its long lagging programs to upgrade the ground systems and receivers for Global Position System (GPS) satellites — including ditching the Air Force B-2 bomber as a first test platform for airborne receivers capable of using the jam-resistant M-Code signal in order to speed them to cross-service aircraft operators, according to a senior service acquisition official.

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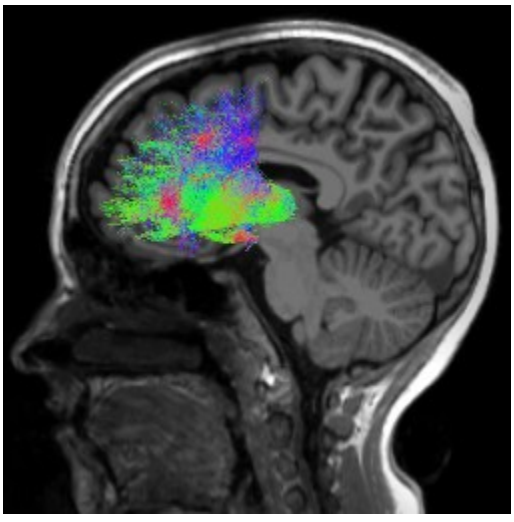
Schizophrenia Brain Activity with Conflicting Information

Researchers introduce a biomarker to indicate whether someone is struggling with the inflexible thinking associated with the disorder



Imaging of the connections between the mediodorsal thalamus and prefrontal cortex in the

human brain.
Photo: Mengzing Liu / Tufts University

In a study published November 7 in the journal Cell Reports Medicine, the researchers show that people with schizophrenia generate distinct neural patterns when asked to make decisions based on conflicting information. The work offers one of the first biological tests to assess whether someone is prone to inflexible thinking and, by monitoring changes in these patterns, a new way to measure whether treatments are working.

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Does US Have 'Green Skills' to Meet Sustainability Targets?

LinkedIn's Global Green Skills Report found that 45% of Gen Z workers say they don't have what it takes to land a green job.

The Good Brigade/Getty Images

LinkedIn's annual Global Green Skills Report, which compiled data from LinkedIn's more than 1 billion profiles, found that the talent pool of workers with "green skills" in fields like decarbonization, sustainable procurement, and climate crisis mitigation needs to double.

That's because the global demand for workers with green skills grew twice as fast as the supply of people with those skills between last year and this year. According to the report, demand for workers with green skills will only continue to grow in the construction, manufacturing, energy, and utilities sectors.

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UK Parliament To Debate World's First 'Smoke-free Generation' Bill

If passed, the new law would ban the sale of tobacco and vapes for anyone born after January 1, 2009
Justin Tallis

The UK's Tobacco and Vapes Bill will prevent anyone born after January 1, 2009 from legally smoking by gradually raising the age at which tobacco can be bought.

The legislation is similar to a bill proposed by the last Conservative administration, which was shelved earlier this year when then-prime minister Rishi Sunak called a general election.

The bill will introduce restrictions on vape advertising and sponsorship, as well as restricting flavours, displays and the packaging of e-cigarettes to reduce their appeal to children and young people.

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40,000 Years of Music Explained in 8 Minutes

thearchaeologist.com

https://youtu.be/Am18ZxKgi_g

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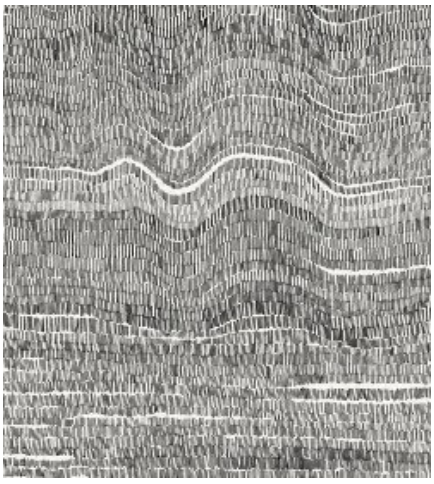
Dendrochronology



Time Recordings (series), by Maurits Wouters

Walking amid a tangle of ancient Sitka spruces and cedars on the island of Gwaii Haanas in British Columbia, Robert Moor wonders how being in the presence of old-growth trees can help us feel, rather than intellectualize, not only the deep past, but also our responsibility to the future.

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Los Angeles Plan to Transform Wastewater into Drinking Water

laconservancy.org

Los Angeles will soon begin building a $740-million project to transform wastewater into purified drinking water in the San Fernando Valley, expanding the city's local water supply in an effort to prepare for worsening droughts compounded by climate change.

The city plans to break ground next month to start construction of new facilities at the Donald C. Tillman Water Reclamation Plant in Van Nuys. When completed, the facilities will purify treated wastewater and produce 20 million gallons of drinking water per day, enough to supply about 250,000 people.

The project has been in the making for three decades. The city built part of the infrastructure, including the pipeline and pump stations, in the 1990s, but the effort was derailed in 2000 when debate erupted over what opponents and newspaper headlines called a "toilet-to-tap" project. The issue was caught up in a mayoral campaign and a 2001 ballot measure calling for the Valley to secede from the city. The plan was then set aside, delaying it for years.

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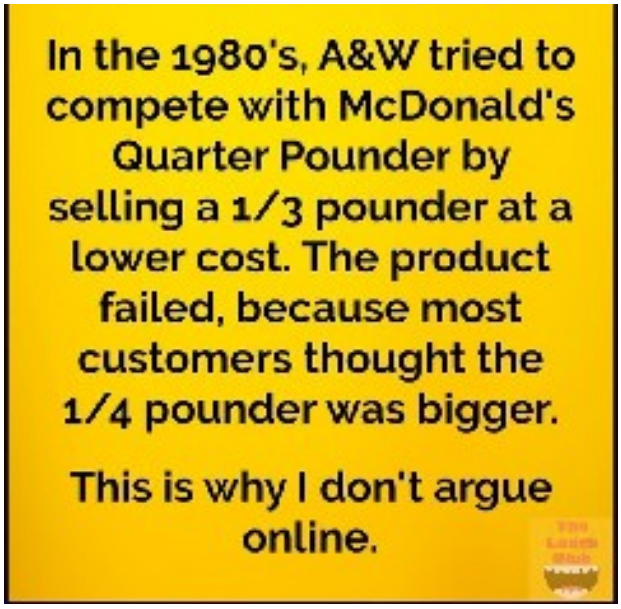

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The Grand Unified Theory of Mathematics

The Langlands program provides a beautifully intricate set of connections between various areas of mathematics, pointing the way toward novel solutions for old problems.

ias.edu

The kingdom of mathematics can be divided into many disparate realms: number theory, geometry, algebra, topology, analysis, combinatorics. But the greatest mathematical achievements often happen when someone discovers an unexpected connection between two of these domains. This makes it possible to port fresh ideas from one field to attack problems in another. Mathematicians call it "bridge building."

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Girding the Grid

Workers repair damage to the main pipeline that connected the North Fork plant to Asheville's pipe system on Oct. 4.
Photographer: Michael Smith/Bloomberg

Dirty tap water in Asheville is a warning to the rest of US about how aging infrastructure and climate change risks pushing systems to collapse.

- After Hurricane Helene dumped almost 14 inches of rain, water blasting from the North Fork Water Treatment plant created a 50-foot-deep crater and, according to a supervisor, turned the lake into "chocolate milk."
- Without mitigation efforts, what happened in North Carolina may play out elsewhere as weather and climate threats pile pressure on already-decrepit infrastructure. Getting systems up to scratch may cost $625 billion over the next 20 years, the Environmental Protection Agency estimates, but that may be a major undercount.
- The aging power grid is no exception. After Helene and Milton put on "stark display" the impacts of extreme weather, the White House is allocating $2 billion to fortify and expand the network.

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Secret Service 'Complacent' Before Trump Shooting

Independent panel recommends overhaul

Acting Director of the Secret Service, Ronald Rowe, Jr.
Marco Bello, Reuters

The Secret Service has become bureaucratic and complacent and an overhaul is needed, according to an independent review released Thursday of the first assassination attempt on former President Donald Trump.

The Secret Service acknowledged failing in its mission to protect the former president, and acting director Ronald Rowe vowed changes. A Senate report also blasted the agency's performanc

https://bit.ly/48cRTI0

Seems like a good prescription for the entire Federal system.

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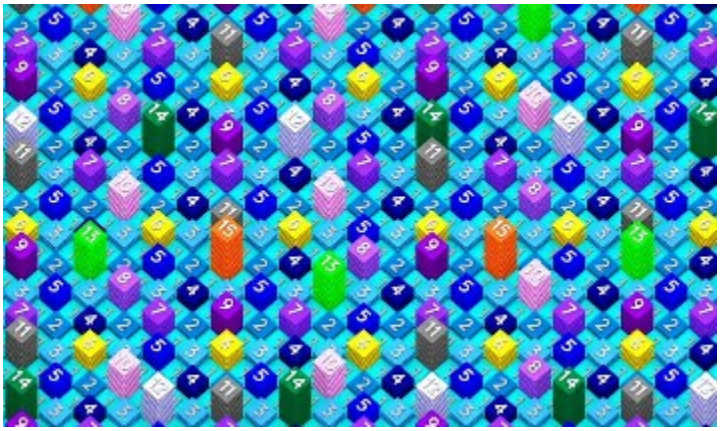
The Power of Packing

Straightforward Math That Stacks Up Nicely



Quanta Magazine

When you arrange cylindrical cans in a cabinet, you're solving a packing problem. Those pyramids of oranges you see in the produce sections of grocery stores settle an important 17th-century conjecture by the astronomer Johannes Kepler. At the start of the Covid-19 pandemic, everyone became extremely conscious of the challenges of social distancing when many people are packed into a room.

Almost every packing problem is similarly simple to state and straightforward to visualize, especially compared to the abstract and abstruse concepts that populate other areas of math.

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Human Brain Can Process Certain Sentences in 'Blink of an Eye'

Researchers say findings differ from previous theories that words are understood one by one

The study found that processing sentences – such as those read on our phones – was easier if they were made up of a subject, verb and object.
Photograph: Victor Bordera/Stocksy United

Prof Liina Pylkkanen, co-author of the study from New York University, said most theories of language processing assume words are understood one by one, in sequence, before being combined to yield the meaning of the whole sentence.

"From this perspective, at-a-glance language processing really shouldn't work since there's just not enough time for all the sequential processing of words and their combination into a larger representation," she said.

However, the research offers fresh insights, revealing we can detect certain sentence structures in as little as 125 milliseconds (ms) – a timeframe similar to the blink of an eye.

https://bit.ly/4ff8Q72

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Boston Uses AI to Reduce Stop-Go Traffic by 50 Percent

dxminds.com

Boston is working with Google to optimize traffic signal timing to improve traffic flow in highly congested areas.

The company's Project Green Light uses artificial intelligence (AI) to model traffic patterns and creates signal timing recommendations that can reduce stop-and-go traffic and emissions. In 2023, Boston was ranked 8th in the world for highest traffic delays.

https://bit.ly/3yz5MTO

And here I thought the election did that.

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Natilus Proposes Blended Wing Body Airliner

Is the world ready for its blended wing body airline. Natilus says it is.

Natilus

A San Diego startup says it will build the world's first blended wing body airliner as soon as it rounds up investors with the billions of dollars needed to mount such an effort. Natilus announced the Horizon, a 200-seat BWB design it says will use 30% less fuel than a conventional aircraft of similar capacity. "The commercial aviation industry is looking for real solutions to become more sustainable, more efficient, and more profitable. With the Horizon, we're introducing improved aviation economics that benefit

the industry while helping safeguard our planet for future generations," said Aleksey Matyushev, CEO and cofounder of Natilus.

It's not that Natilus is promoting a novel concept, however. Both Airbus and Boeing are kicking the tires on BWBs and the Air Force is also investigating them. Bombardier has built a flying scale model of a BWB business jet, but they're a long way from building an airplane. Matyushev says he can have his in the air by 2030 and some industry heavyweights think he's right. Dennis Muilenburg, a former Boeing CEO who now runs a venture capital company, added his comments to Natilus' press release. "The Natilus Horizon aircraft is poised to revolutionize fleet operations, enabling airlines to maximize capacity while delivering an elevated passenger experience," Muilenburg said.

Russ Niles for AVweb

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Chuck Yeager Breaks the Sound Barrier

October 14, 1947

On an autumn day in Southern California, U.S. Air Force Captain Charles E. "Chuck" Yeager became the first person to fly an aircraft faster than the speed of sound, or Mach 1. Built specifically for that purpose, the plane — nicknamed "Glamorous Glennis" in honor of Yeager's wife — was air launched from the bomb bay of a Boeing B-29 and reached 700 miles per hour (Mach 1.06).

Before the flight, many believed an invisible barrier would destroy any plane that reached such speeds. Yeager later said: "I realized that the mission had to end in a let-down because the real barrier wasn't in the sky but in our knowledge and experience of supersonic flight." Check out footage of the pilot achieving the feat, and keep your ears peeled for that trademark sonic boom.

https://www.youtube.com/watch?v=hjVTaubVSKE

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During my job interview yesterday, the interviewer asked, 'Why do you think I should give you this job?'

I replied, 'Because my best friend Dave works in your IT department, and he told me you're having an affair with your secretary.'

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Chords & Riffs

Benjamin Zander Talks About Beethoven Symphonies

youtube.com

I opened a door last week with looks at Bach and his legacy. This week it's time to open doors to Beethoven's genius

Zander Pre-Concert Talk: Beethoven Symphony No. 5
https://youtu.be/L_bd1J98jNQ?t=1
1st movement Interpretation Class) https://youtu.be/wCkQ138sg6M
2nd movement Boston Philharmonic Zander https://youtu.be/2qNXP-0QRCI
Movements 3 & 4 Boston Philharmonic
https://youtu.be/iAhndrhY2MQ?list=RDiAhndrhY2MQ&t=1

Beethoven Symphony No. 9 Zander https://bit.ly/3YxW9xm

I'll come back Benjamin Zander's talks again in the near future, but I wanted to concentrate here on his thoughts on Beethoven's 5th and 9th Symphonies.

Jazz pianist Jon Baptiste on Beethoven https://bit.ly/3OdKf7h

I took a class on symphonic works in college taught by the music department's boss who concluded that nothing of value had been composed since the 5th and that the 9th by comparison was the ramblings of a madman. I have no hesitation in assessing his vision as the ramblings of a locked-in nineteenth century prig.

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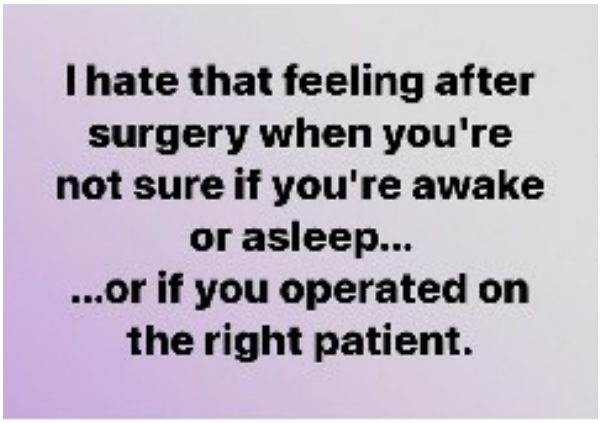

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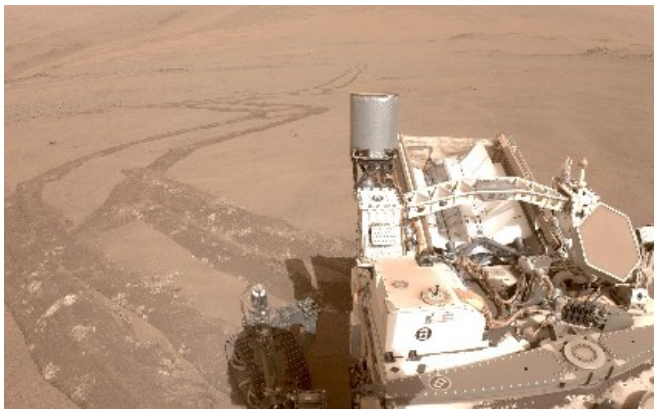
Perseverance Rover Looks Back While Climbing Slippery Slope

On its way up the side of Jezero Crater, the agency's latest Red Planet off-roader peers all the way back to its landing site and scopes the path ahead.



Tracks shown in this image indicate the slipperiness of the terrain Perseverance has encountered during its climb up the rim of Jezero Crater.
Credit: NASA/JPL-Caltech

NASA's Perseverance Mars rover is negotiating a steeply sloping route up Jezero Crater's western wall with the aim of cresting the rim in early December. During the

climb, the rover snapped not only a sweeping view of Jezero Crater's interior, but also imagery of the tracks it left after some wheel slippage along the way.

https://bit.ly/3CfTocs

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Lost Maya City, Including Pyramids, Discovered in Mexico's Jungle

Lidar technology has revealed extensive Maya infrastructure across Campeche, located in Mexico's Yucatán.

A lidar image of previously unknown Maya structures in Mexico.
Image: Auld-Thomas et al., Antiquity 2024

Archaeologists have discovered a Maya city beneath the jungle canopy in Campeche, Mexico, according to a study released yesterday. The ancient site, dubbed Valeriana by the team, contains more than 6,600 structures, including pyramids and ball courts. It is believed to be one of the largest Maya sites in Latin America.

The city, which may have housed up to 50,000 people during the Classic Maya period (years 250 to 900), features two major centers about 1.2 miles apart, linked by causeways. Researchers suggest Valeriana was likely an important political or economic center in the region due to its layout and construction.

Archaeologists discovered the city by analyzing preexisting lidar data—a technique in which variations in surface height are measured using airborne laser mapping. The site was found when a researcher stumbled upon the data, originally gathered for ecological and forestry studies, online. Learn more about other discoveries enabled by lidar here.

https://bit.ly/3C7J7iD

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Scientists Establish the Best Algorithm for Traversing a Map

Dijkstra's algorithm was long thought to be the most efficient way to find a graph's best routes. Researchers have now proven that it's "universally optimal."

Closeup network connection on a blurred network background.
Photograph: Yuichiro Chino; Getty Images

If you've been making the same commute for a long time, you've probably settled on what seems like the best route. But "best" is a slippery concept. Perhaps one day there's an accident or road closure, and your fastest route becomes the slowest.

Scenarios like this are also a challenge for researchers who develop algorithms, the step-by-step procedures that computers use to solve problems. Many different algorithms can solve any given problem, and the question of which is best can be frustratingly ambiguous.

For most problems, it's simply not possible to find such a unicorn. But a new proof shows that for the quintessential path-finding problem, one algorithm is close to ideal: Assuming worst-case traffic patterns, it's the best approach on every possible street grid. What's more, the algorithm is nearly 70 years old and a staple of the undergraduate computer science curriculum. The new work will be presented with a best-paper award at the 2024 Symposium on Foundations of Computer Science next week.

https://bit.ly/3UUYRMD

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32 Times Lasers Revealed Hidden Forts and Settlements

Lasers have helped uncover ancient human-made structures the world over.

Lidar has made it easier to find and study archaeological remains beneath the foliage of the Angkor region in Cambodia.
(Image credit: Tang Chhin Sothy via Getty Images)

Lasers are being used extensively in archaeology for recording and discovering sites as well as analyzing artifacts in great detail. One laser technology that is particularly good at discovering new sites is lidar (light detection and ranging).

In this technique, pulsed lasers are emitted (usually from an aircraft) and the reflected light is used to map out the landscape. This technique can be especially useful when there is a large amount of vegetation covering a site.

In this countdown, Live Science looks at 32 examples of forts and settlements that have been revealed by lasers.

https://bit.ly/3NTFa3K

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How 1.5 Million Christmas Ornaments Are Made By Hand

pinterest

The Inge-Glas company is one of the oldest in the world still making Christmas ornaments the traditional way. It was once one of over 1,500 manufacturers in this part of Eastern Germany, blowing glass ornaments and painting them by hand. But today, most Christmas decorations are mass-produced in China.

https://youtu.be/hkZF-fPxOPY

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Why We Can Eat Rare Steak But Not Rare Chicken

No matter how delicious it looks, you shouldn't eat chicken "rare".

Mmm, gastrointestinal distress.
Image credit: stockcreations/shutterstock.com

"When cooked, chicken can be a nutritious choice, but raw chicken can be contaminated with Campylobacter, Salmonella, or Clostridium perfringens germs," the US Centers for Disease Control and Prevention explains. "If you eat undercooked chicken, you can get a foodborne illness, also called food poisoning. You can also get

sick if you eat other foods or beverages that are contaminated by raw chicken or its juices."

https://bit.ly/3UJv5u7

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How Did Supermassive Black Holes Get Big So Fast?

How astrophysicist Sophie Koudmani's research on supermassive black holes is rewriting the history of our universe

An artist's rendering of a black hole
(Image credit: Vadim Sadovski via Shutterstock)

A supermassive mystery lurks at the center of the Milky Way. Supermassive black holes are gigantic ruptures in space-time that sit in the middle of many galaxies, periodically sucking in matter before spitting it out at near light speeds to shape how galaxies evolve.

Yet how they came to be so enormous is a prevailing mystery in astrophysics, made even deeper by the James Webb Space Telescope (JWST). Since it came online in 2022, the telescope has found that the cosmic monsters are shockingly abundant and massive

in the few million years after the Big Bang — a discovery that defies many of our best models for how black holes grew.

Sophie Koudmani is an astrophysicist at the University of Cambridge searching for answers to this problem. Live Science sat down with her at the New Scientist Live event in London to discuss the cosmic monsters, how they could have formed, and how her work using supercomputers to simulate them could rewrite the history of our universe.

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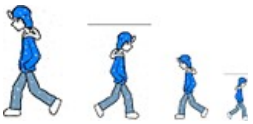
My Walking Thoughts



For Sunday November 24 2024

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The Importance of walking

Haven't lost a pound.
Apparently you have to go there!

Every time I hear the dirty word 'exercise',
I wash my mouth out with chocolate.

I do have flabby thighs,
but fortunately my stomach covers them.

The advantage of exercising every day
is so when you die, they'll say,
'Well, he looks good doesn't he.

***

A Day of Big Little Things

Scrubbed and polished by 0530, I was heading for the dining hall when I became aware of a scent far more tantalizing than the military's finest breakfast of SOS and hash. It was a GTC-85 start cart's jet fuel's exhaust, ghosting through the still dark flightline, the sure sign of the beginning of a new day at a jet airbase. Now, after Sixty-five years, do you think I can sense the scent in the deep recesses of my nasal network… in the vast canyons of my mind's eye? You bet I can.

Even today, I yearn for the special reward of that pre-dawn luxury in the day's first foray into such hidden horizons as those brought to life through the magic of JP-4, but there *at that instant*, snared in thrall of a secret vision, I knew I had stumbled into the exact place where I belonged.

***

Bypassing the SOS and potatoes, I piled several strips of bacon on top of a wad of grits, then filled the rest of the plate with a pair of flapjacks loaded with butter and some sort of syrup. Seated, thinking about the upcoming lesson on the F-9's hydraulic system, a Navy lieutenant named Crayton—an instructor at VT-21--drew up the chair next to me, and after taking a swig of coffee, surprised me by asking how I was liking the flight training program. Yikes, a grownup aviator asking me a question as if I was worthy of such conversation.

I told him of my meager experience to this point, but no matter, we chatted until time for me to head for class. It had been a heady experience, the first of its kind since I had entered flight training. You'll meet Lieutenant Crayton again, both in these informal breakfast chats and when he became my principal instructor.

I need to add something here.

You may notice that I do not use his first name, but as many of those of my vintage will attest, such familiarity between students and instructors, while not actually forbidden, was frowned upon. The same still obtained when I became an instructor (again at Kingsville but at the arch-rival VT-22). When I visited Whiting Field a quarter century later, I was surprised and somewhat saddened to find things have changed with instructors and students readily using their first names in direct conversation.

To solidify my claim as a card-carrying curmudgeon, I have to tell you I genuinely believe in the importance of *distance* where familiarity could taint the basis of what is in essence a professional relationship. For example, I think it's important to maintain standoff space when dealing with doctors, teachers, and other such advisors, where their unbiased analysis is essential to the tasks at hand. I was careful not to step over this divide with Lieutenant Crayton or any of my instructors, and still think it best.

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Anyway, the class for that day concerned the aircraft's hydraulic systems, beginning with the engine-driven variable displacement Vickers hydraulic pump whose workings flat blew me away. In the classroom, an electronic model showed in detail how the pump was able to react to constantly changing demands on its output with no action on the part of the pilot. While I understand its principle, I think it's better I let some videos show you different types of hydraulic pumps and how they work.

Types of Hydraulic Pumps - https://youtu.be/Qy1iV6EzNHg
How a variable displacement pump works - https://youtu.be/mgn1UDazkRo

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Hoofing it back to the BOQ in the gathering dusk, I thought it had been quite a day, stuffed to the gunnels with new perspectives… by no means the least of which was the scent of burning JP-4 in the morning, nor what new wonders awaited me in the morrow.

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