

Ode to E Pluribus Unum for Sunday February 2 2025

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Stunning New Photos of Jupiter from Juno's Recent Flyby

A recent flyby from NASA's Juno spacecraft shows us more details of the planet, its 66th trip around the celestial body.



Photo: NASA / JPL / SwRI / MSSS / Gerald Eichstädt / Thomas Thomopoulos © (CC BY 3.0)

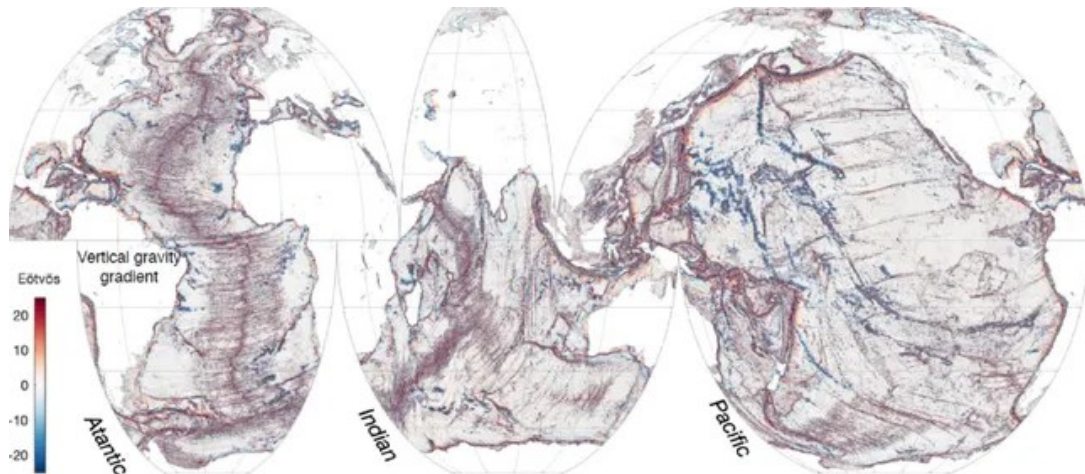
While Juno's onboard cameras can take images, NASA does not have a dedicated team to process these for public view. Instead, it relies on citizen scientists, who readily spend dozens of hours processing, stitching together, and sometimes enhancing these images.

<https://bit.ly/3YZI9ht>

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Satellites Reveal Stunningly Detailed Maps of Earth's Seafloors

A newly-deployed satellite has created the most-detailed map yet of the ocean floor, finding hundreds of hills and underwater volcanoes that were previously missed.



*In its first year of operation, the SWOT satellite captured more details of the sea floor than in 30 years of data collected by older satellites.
(Image credit: NASA/SWOT)*

The first year of measurements from NASA's Surface Water and Ocean Topography (SWOT) satellite mission, launched in December 2022 and developed by NASA and France's Centre National D'Etudes Spatiales, enabled researchers to study the boundaries between continents and identify underwater hills and volcanoes that are too small to be detected by earlier satellites.

<https://bit.ly/3VEDEXv>

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Will Green Hydrogen Prices Drop in Coming Years?

Technology research firm ABI Research finds that prices for the fuel will decrease in the next five years.



Sakorn Sukkasemsakorn/Getty Images

By 2030, green hydrogen prices could fall to \$2.50 per kilogram—a significant reduction from the \$6 to \$7 per kilogram it costs now—according to a recent report from ABI Research.

Gray hydrogen is created using natural gas, like methane, and produces carbon. Green hydrogen is created using renewable energy, and thus doesn't produce any non-sustainable byproduct—but it's more costly to produce.

ABI Research's predictions are based on its beliefs that electrolyzers, which are used to create hydrogen, will become more efficient and cheaper themselves.

<https://bit.ly/4guiLX1>

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Poetry Corner

What Is This Dying?

What is this dying?
We rejoice the change in leaves
rejecting green
grabbing gold and red
we feel spoon fed
beauty in such lush
lands.
On the other hand
when we
when I
know I'm on the path to die,
what am I to rejoice?
How do I exist
when feeling strangled
with no choice?
Which leaf on that tree

Katherine Holden

said no
I refuse to go
change me all you desire
wind,
blow me higher!
Ah, that single leaf
living in my mind
truly does not wish
to be left behind
the only one caught
up in a gust
pushed up
beyond it's natural path.
The idea does,
in this moment,
make me laugh.

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Nine of the Most 'Genetically Isolated' Human Populations

Geographical barriers and cultural differences can prevent people from mingling with their neighbors, leading to genetic isolation — and the phenomenon is more common than most people think.



(Image credit: Cavan Images / Alamy Stock Photo)

Genetic diversity in a given population can be reduced in what is known as a "founder event" — when a small group of people splits off from a larger population, which leads to a smaller gene pool in the isolated group. In a study of 460 populations around the world, roughly half showed evidence of a recent founder event, [researchers](#) concluded in 2022.

<https://bit.ly/3DInxYx>

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Pine Tree Time-lapse 300 Days



thekidshouldseethis

"The stone pine, botanical name *Pinus pinea*, also known as the Italian stone pine, Mediterranean stone pine, umbrella pine and parasol pine, is a tree from the pine family (Pinaceae). The tree is native to the Mediterranean region, occurring in Southern Europe and the Levant. The species was introduced into North Africa millennia ago, and is also naturalized in the Canary Islands, South Africa and New South Wales."

<https://youtu.be/a4kr4SxMNnA>

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Why Are Men More Vulnerable to Depression in Fatherhood?

Understanding the unique challenges faced by fathers during the perinatal period is essential for providing support that benefits not just fathers, but entire families.



Photo: Christopher Lemerrier, via Unsplash

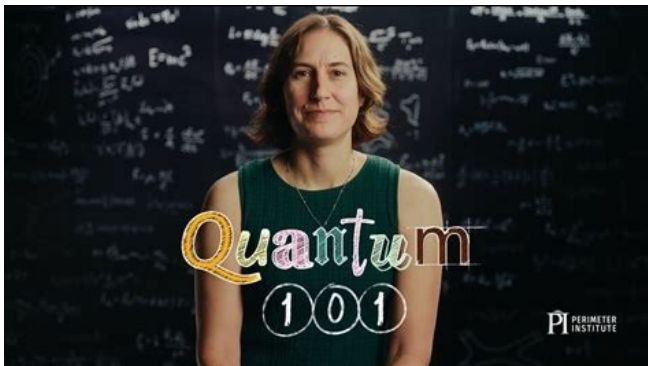
The baseline rate of depression among men living in developed nations is around 5 percent. However, this figure doubles to more than 10 percent during the perinatal period, which includes pregnancy and the first postnatal year. For comparison, the rate of perinatal depression in women is around 25 percent. The risk for parents peaks three to six months after birth, with rates climbing to around 25 percent for fathers and 40 percent for mothers.

<https://bit.ly/49UKs9u>

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QUANTUM THOUGHTS

Quantum 101 Episode 8: Photoelectric Effect Explained



Katie Mack
youtube

Digital cameras, small enough to be embedded in our phones, have transformed photography and changed how we interact with the world and each other.

Most smartphones today use a sensor called a complementary metal oxide semiconductor or CMOS. It's similar to a CCD or charge coupled device and works because of this one weird trick physicist discovered more than a century ago.

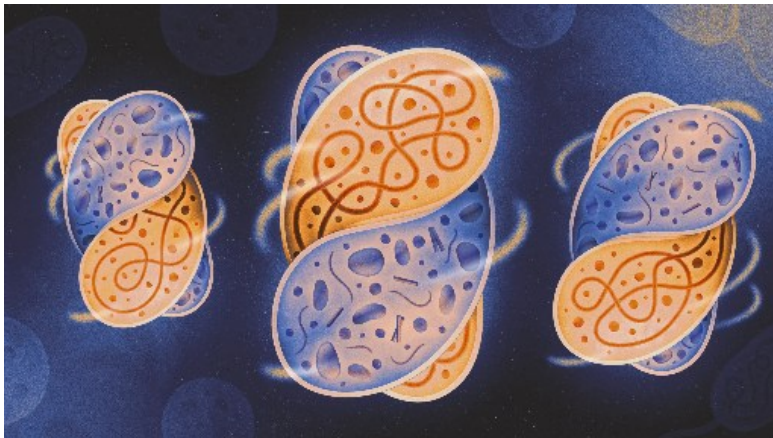
<https://youtu.be/jWbwDTPju-M>

Theoretical cosmologist [Katherine \(Katie\) Mack](#) is the Perimeter Institute Hawking Chair in Cosmology and Science Communication.

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Scientists Re-Create the Microbial Dance That Sparked Complex Life

Evolution was fueled by endosymbiosis, cellular alliances in which one microbe makes a permanent home inside another. For the first time, biologists made it happen in the lab.



Endosymbiotic relationships between two microbes, with one living inside the other, underlie cellular complexity across the tree of life. Until now, no one has observed the opening choreography of such a partnership's formation.

Kristina Armitage/Quanta Magazine

The phenomenon of one cell living inside another, called endosymbiosis, has fueled the evolution of complex life. Last year, scientists discovered the "nitroplast," an endosymbiont that helps some algae process nitrogen.

Now, for the first time, researchers have been able to spark cooperation without killing the bacteria or host, offering a glimpse at what happens in the microbial wild.

<https://bit.ly/3W1MKha>

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Oklahoma Firm Working Toward 'Perpetual Flight'

Skydweller stayed aloft for 22.5 hours on one of its test flights.



Skydweller Aero

An Oklahoma City-based company says it's on the cusp of developing a solar-powered drone that will effectively never have to land. "We are developing what we believe is the world's first operationally viable perpetual flight platform," said Barry Matsumori, COO of Skydweller Aero. The airliner-sized platform, with a wingspan greater than that of a 747, flew six times in 2024 from Stennis International Airport in Mississippi. Four of the flights were fully autonomous. The longest was 22.5 hours and the drone got as high as 33,000 feet.

The company says it's getting ready to commercialize the drones and envisions 30- to 90-day missions looking for drug smugglers and pirates and doing military surveillance. The test aircraft has a payload of 800 pounds and is made from carbon fiber. Its development was inspired by the solar-powered circumnavigation of Solar Impulse in 2016.

By Russ Niles, AVweb



Addiction (*A Deep Dive By the 1440 Digest*)



zululandobserver.co.za

Background

Addiction is a disorder characterized by a pattern of persistent behavior that continues despite growing negative consequences. While often discussed in the context of drugs or alcohol, addiction can involve any substance or behavior that creates rewarding effects for an individual.

What makes addiction particularly complex is that it represents more than just physical dependence or tolerance to a substance. Rather, it is characterized by continuing the behavior even as it causes psychological distress, social conflict, or physical harm.

This pattern affects approximately 15% of the US population through substance use disorders alone. Alcohol is by far the most common addiction (see top 10), followed by nicotine and marijuana.

How It Works

Addiction develops through our body's natural learning processes as individuals interact with their environment. This interaction involves both immediate rewards (positive reinforcement) and the relief of discomfort (negative reinforcement).

When someone engages in potentially addictive behavior, their brain releases a flood of dopamine—a neurotransmitter associated with reward and learning. Over time, the brain adapts to these dopamine surges by physically reducing the number of dopamine receptors to mitigate the effects of overstimulation.

This protective response has two critical effects: The brain becomes less sensitive to the rewarding effects of a stimulus (tolerance) while becoming more sensitive to negative

Withdrawal becomes particularly dangerous with alcohol addiction. Because alcohol is a nervous system depressant, abruptly quitting after chronic abuse can cause a severe

rebound effect known as delirium tremens. The nervous system becomes dangerously overactive, leading to tremors, seizures, and dangerously high blood pressure that can even be fatal.

What makes addiction particularly persistent is how it becomes embedded in multiple aspects of a person's life. The brain learns to associate specific people, places, or situations (cues) with the addictive behavior.

These cues can trigger powerful cravings, even after long periods of abstinence. Environmental stressors can make these cravings even more intense, creating a vicious cycle where stress leads to substance use. While the substance may temporarily relieve the stress, it ultimately makes the person more sensitive to future stress.

Treatment

Modern addiction treatment recognizes that no single approach works for everyone. The most effective treatments typically combine multiple strategies that address both individual and environmental factors.

Evidence shows that behavioral therapies can help people identify triggers, develop coping strategies, and modify harmful behavior patterns. These approaches work best when combined with social support, whether through family involvement or therapeutic communities.

For many substance addictions, medication can help manage withdrawal symptoms and reduce cravings. A common example is naltrexone, a medication used to treat alcohol use disorder and opioid use disorder by blocking the positive feelings associated with taking these substances. Perhaps the most notable of all is methadone, a substance used to treat opioid addiction that works both by relieving withdrawal symptoms and reducing cravings.

The most successful approaches integrate medical treatment with behavioral interventions and social support. Many people find lasting recovery through support groups, spiritual communities, or by making fundamental changes to their social environment. The goal is not just to stop the addictive behavior but to build a life where the behavior is no longer needed.

[Can brain implants help with addiction?](#)

[The bird and its golden nugget: a metaphor for addiction](#)

[The addiction to work](#)

[Debunking myths about addiction](#)

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How California fights fires from the skies

Numerous firefighting air tankers from throughout California are flying fire suppression missions as conditions allow



fireaviation.com

According to Cal Fire's website, the fleet's more than 60 planes and helicopters make it the largest department-owned fleet of aerial firefighting equipment in the world. But if extra resources are needed, the department hires additional planes on a contract basis and in extreme conditions, it can request help from the military.

<https://bit.ly/42cygz8>

I'll try not overburden you with fire coverage, but I think this a good archival piece. Interestingly, back in 1975, my neighbor, Norm Harris and I did a SBIR study for the USDOA on the conversion of retiring C-130s into fire bombers.

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Lunar New Year



huyhoa

Background

An estimated 2 billion people celebrate Lunar New Year, aka Chinese New Year or Spring Festival. The 15-day festival—which can include a weeklong public holiday—begins with the first new moon of the lunar calendar, sometime between Jan. 21 and Feb. 20. This adheres to the Chinese lunisolar calendar, which incorporates both the sun's and the moon's positions to mark time.

Lunar New Year is a national holiday in countries including China, Indonesia, and Singapore, while many other cultures have similar Lunar New Year celebrations, such as Tết in Vietnam and Seollal in Korea. The holiday is regarded as the largest annual human migration in history.

History

The first records of a Lunar New Year celebration are from roughly 3,500 years ago, during the Shang dynasty in China. These records mentioned the sacrifices people made to gods and ancestors at the end of each year.

According to legend, the holiday began when a village terrorized by a mythical beast called the Nian discovered the creature was afraid of loud noises and the color red. They began a yearly tradition of putting red lanterns outside their homes and burning crackling bamboo to keep the Nian away. Over the centuries, it evolved into a more celebratory social event that included feasting, dancing, and fireworks.

Imperial rule ended and the Republic of China was established in 1912, when the new government transitioned the country to the Gregorian calendar. However, the people maintained Lunar New Year as a valuable cultural tradition and the government eventually recognized it as a public holiday in 1914.

After Mao Zedong and the Communist Party came to power in 1949, they banned traditional New Year celebrations. Following Mao's death, Lunar New Year festivals were reinstated in 1980, and it was designated as a weeklong public holiday in 1996.

Celebrations

To prepare for the event, people clean their homes to “sweep out” the old year and make space for the new one. They decorate with red lanterns and wall hangings, since red is a symbol of prosperity and good fortune.

The celebration begins on New Year's Eve with a family reunion feast featuring dishes like roast duck or steamed fish. Many people eat vegetarian on New Year's Day in keeping with the Buddhist tradition.

Over the 15 days of the festival, noisy fireworks are lit to scare away the Nian, and dancers perform with colorful dragon puppets that symbolize wisdom, power, and

wealth. People also exchange *hóngbāo*, or small red envelopes containing money. The final day of celebration corresponds with the full moon and ends with a spectacular display of colorful lights and lanterns.

The Chinese zodiac, a 12-year cycle in which each year corresponds to a specific animal and its traits, is also correlated with the Lunar New Year; people might perform rituals or wear specific colors to find favor under the new astrological sign.

Impact

With more than 4.5 billion trips made worldwide over a 40-day period, the Lunar New Year is described as “the world’s largest travel rush.” In China, 226 million domestic trips took place for the holiday in 2023, continuing to bounce back from a pandemic-era low of 98 million in 2021.

Lunar New Year is a significant driver of tourism income, and in 2024, the holiday generated nearly \$88B in revenue, surpassing pre-COVID numbers.

For those around for Tết 1968, the Lunar New Year holds special memories.

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It's a Boom Time for Education Freedom

People want choice in how they teach their kids and are happy when they get it.



Brookesidemontessori.org

This week is National School Choice Week, and there's a lot to celebrate. Innovation in education was accelerated by pandemic-era school closures, as was interest in alternatives to one-size-fits-some schooling. With education funding following the student rather than being assigned to government-run institutions in a growing number of states, more families are choosing what works best for their kids—and the majority are satisfied with their decisions.

Proliferating School Choice Programs

"By the end of 2024, more than one million students in America were participating in a private school choice program," EdChoice's Colyn Ritter reported this week.

"Participation growth has climbed rapidly, having more than doubled since the beginning of 2020."

"Florida leads the way with nearly 13% of students enrolled in a private school choice program. Arizona follows close behind, with 10% of their students participating in a private school choice program," he adds.

By "private school choice program," Ritter refers to the rapid adoption in recent years of programs that allow students to use all or part of the funding allocated by their state for public school education to pay for private schooling, microschools, homeschooling, and other alternatives. A majority of states now offer some sort of education savings account (ESA), tax credit, or voucher program. The terminology can get confusing and implementation varies from place to place, but ESAs are generally the most flexible while vouchers offer direct payment for tuition at private institutions.

Families Choose a Wide Range of Education Options

That's not the end of it. Plenty of families make their own education decisions without going through one of these programs. Drawing on the most current data, Ritter breaks down school attendance accordingly: 2.2 percent of students attend private schools through an educational choice program, 6.8 percent attend private school by other means (paying tuition themselves, private scholarships, and the like), 74.8 percent attend a traditional public school, 4.9 percent attend a magnet school, 6.6 percent attend a privately run but publicly funded charter school, and 4.7 percent are homeschooled.

Along with private school choice programs, homeschooling has seen rapid growth in recent years. Many families stepped in to teach their children when public health policies shuttered traditional public schools, and they discovered they liked both the process and the results.

Based on Census Bureau Household Pulse Survey data, Johns Hopkins University's Homeschool Hub, which focuses on DIY education, estimates that in the 2022-2023 school year, 5.82 percent of American K-12 students were homeschooled (numbers vary for this inconsistently tracked option).

Since then, Johns Hopkins researchers have seen continued growth in homeschooling. Not all states count homeschoolers, but of 21 states reporting data for the 2023-2024 school year as of this past September, "there are three states with continued growth, meaning that there was no post-pandemic decline.... Sixteen states show a rebounding trend, meaning that there was a post-pandemic decline, in some cases several years of a decline, and then, in 2023-2024, the number of homeschoolers increased again." Only two states saw declines in the ranks of homeschoolers, and in one of those (New Hampshire), the drop may result from a change in how homeschooled students who use ESAs are classified.

Parents Are Happy When Allowed To Choose

What's interesting is that the growing adoption of different types of education reflects a shift towards what parents of school-age children say they would pick if they could. In December 2024, Morning Consult/EdChoice pollsters asked, "If given the option, what type of school would you select in order to obtain the best education for your child?" Among school parents, 8 percent picked charter schools, 13 percent chose homeschooling, 12 percent favored religious private schools, 20 percent chose secular private schools, 35 percent selected public schools in their district, and 6 percent preferred out-of-district public schools (the remainder didn't know or had no opinion).

So, removing legal barriers to options and making it easier for people to afford them rather than pay for tuition on top of taxes allows families to move closer to the education approaches they want for their children. The growing adoption of these options makes it clear that people mean what they say.

Unsurprisingly, when people get what they prefer, they're reasonably happy with the outcome. The same poll (which is conducted monthly) asked parents, "to what extent are you satisfied or dissatisfied with your child's/children's experiences with the following types of schooling?" Eighty-one percent of school parents reported being very or somewhat satisfied with charter schools, 94 percent reported satisfaction with homeschooling, 90 percent were satisfied with religious private schools, 88 percent said they were satisfied with secular private schools, 80 percent were satisfied with in-district public schools, and 85 percent satisfied with out-of-district public schools.

That said, majorities of parents were "very satisfied" only with homeschooling and both religious and secular private schools. By and large, parents of school-age children are pretty happy with their kids' education, and that's especially true when it's one they've obviously chosen themselves.

Wide Support for Choice

School choice has long been popular among Americans, and that hasn't changed as options proliferate and families have increased opportunity to jettison schooling that doesn't work for their kids and replace it with something that does. For some, that may be traditional public schools, and for others it's a wide range of private schools with different philosophies or one of the many DIY learning approaches bundled under the term "homeschooling." When asked, the public makes it clear it wants freedom to choose.

The American Federation for Children maintains records of years of polling on the question: "School choice gives parents the right to use the tax dollars designated for their child's education to send their child to the public or private school which best serves their needs. Generally speaking, would you say you support or oppose the concept of school choice?" The idea consistently draws support from roughly two-thirds to three-quarters of respondents.

After the chaos of fumbled school closures and lost learning time during the COVID-19 pandemic and simultaneous schoolroom culture-war battles over what is taught and how to teach it, it would be surprising to see anything else. Why not opt out of a headache if you can choose something better?

Americans want school choice and they're happy when they get it. There's a lesson in there.

J.D. Tuccille - Reason

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FLASHMOB CENTRAL

USAF Band WWII Holiday Flashback



youtube

<https://youtu.be/khQN5ylb3H0>

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NASA Built New Tires for Mars. They're Nothing Like Yours.

The next Mars rovers may traverse the Red Planet with futuristic tires..



*NASA's shape memory alloy spring tires in testing at Airbus Defense and Space.
Credit: NASA*

NASA's Glenn Research Center released imagery and footage from testing of a novel tire, called a shape memory alloy spring tire, that would be capable of incurring significant deformation on rugged terrain, before springing back to its original shape.

The space agency recently tested the tires on Martian-simulated terrain at Airbus Defence and Space in the United Kingdom. The engineers reported the tires passed testing on the rocky and slippery artificial topography — an encouraging endorsement of the technology.

<https://bit.ly/3ChEeEc>

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How WhatsApp for Business Changed the World - Rest of World



techupdates.com

WhatsApp is the world's most widely used messaging app; the company says it has 2 billion daily users. These users send more than 100 billion messages every day in 60 languages across 180 countries. Some 400 million of those users are in India, WhatsApp's biggest market, followed by another 120 million in Brazil.

What it is and how it works.

<https://bit.ly/4050Oag>

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Watch Earth in 4K With Sen's New Video Livestream from the ISS



*A view from Sen's new 24/7 livestream from the ISS.
(Image credit: Sen)*

A wide angle lens captures the long curve of Earth's horizon, with the occasional piece of the space station moving in and out of frame. A tighter view focuses directly on Earth, showing a stretch about 150 miles x 110 miles (240 kilometers x 180 kilometers). The third camera looks at the space station's forward docking port, connected to the Harmony module.

<https://bit.ly/4hnIYY7>

If you don't know what to do for the next hour or two, you might try watching this.

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Best of the Web: Homebuilt Spitfire

Bob Deford spent 28 years of his retirement building a replica Spitfire and the result was spectacular.



Bob Deford

<https://youtu.be/Iw5uyxFCrQ0>

What a story.

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Bipolar Disorder Decoded



Abnormal mood swings are common for individuals with bipolar disorder. Bipolar disorder is one of the most heritable psychiatric disorders... estimated to be around 80 percent. University of Oslo.

An international team of researchers has [pinpointed 36 genes](#) linked to bipolar disorder in the largest study conducted to date on the biological mechanisms underlying the condition. The findings could potentially help doctors intervene early and better diagnose and treat individuals at risk.

Bipolar disorder ([watch overview](#)) is largely genetic, with an estimated heritability of around 80%, meaning there is a significant genetic predisposition to developing the chronic mental health condition. The disorder is characterized by intense mood swings between manic and depressive episodes, which can alter a person's energy levels, behavior, thinking patterns, and ability to function in daily life. Around 40 million to 50 million people worldwide experience bipolar disorder.

The findings also identified 298 genomic regions—specific locations in our DNA sequence—associated with bipolar disorder, of which 267 are newly discovered. Roughly 158,000 individuals with bipolar disorder and 2.8 million healthy individuals worldwide participated in the study.

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Gene Editing Tool Reduces Alzheimer’s Plaque Precursor in Mice



A new gene editing tool helps cells skip gene regions with problematic mutations. Professor Pablo Perez-Pinera, center, with graduate students Shraddha Shirguppe, left, and Angelo Miskalis, led a team that applied the tool to reduce proteins associated with Alzheimer’s disease in mice.

Photo by Fred Zwicky

A new gene editing tool that helps cellular machinery skip parts of genes responsible for diseases has been applied to reduce the formation of amyloid-beta plaque precursors in a mouse model of Alzheimer’s disease, researchers at the University of Illinois Urbana-Champaign report.

The application in live mice shows the improved efficiency of the tool, called SPLICER, over the current standard in gene editing technology, as well as the potential for application in other diseases, the researchers said. Led by Pablo Perez-Pinera, a professor of bioengineering at the U. of I., the researchers published their [findings](#) in the journal Nature Communications.

<https://bit.ly/4gQaVXT>

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Concept Cells Help Your Brain Abstract Information and Build Memories

Individual cells in the brain light up for specific ideas. These concept neurons, once known as “Jennifer Aniston cells,” help us think, imagine and remember episodes from our lives.



Abstract representations of individuals, objects and ideas are stored in individual brain cells known as concept neurons. Research suggests that they are central to memory.

Carlos Arrojo for Quanta Magazine

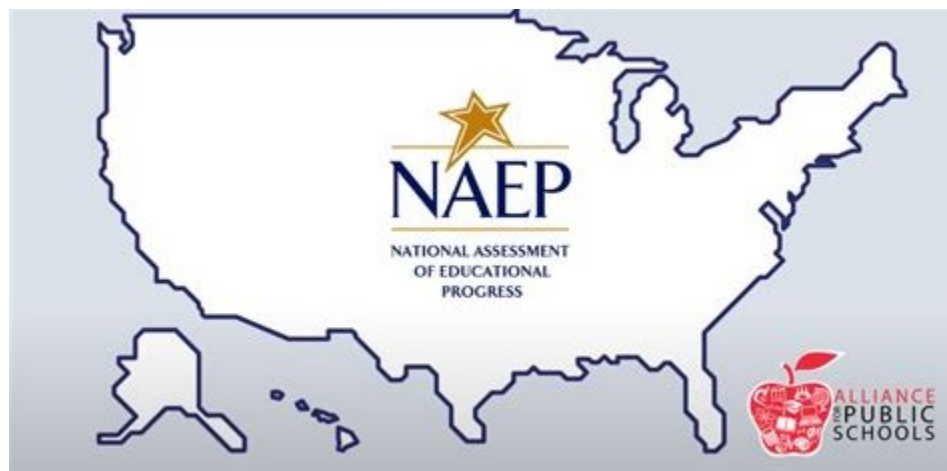
The few groups with access to patients and the ability to record the activity of single neurons are excitedly continuing experiments. What will come of these? Who knows? It's a hotly debated concept with potentially profound implications. If no other animals can represent concepts in the brain, this could be the basis of our intelligence.

<https://bit.ly/4hnEykd>

This is pretty meaty stuff you may want to read and think about.

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NAEP Report Cards



All4schools.org

Mathematics Fourth and Eighth Grades

In 2024, the National Center for Education Statistics (NCES) administered the National Assessment of Educational Progress (NAEP) mathematics assessment to representative samples of fourth- and eighth-grade students in the nation, states, the District of Columbia, Puerto Rico, Department of Defense schools, and 26 participating large urban districts. The assessments measured students' knowledge and skills in mathematics and their ability to solve problems in mathematical and real-world contexts. Students also answered survey questions about their opportunities to learn about and engage in mathematics inside and outside of school.

<https://bit.ly/4hyXjAx>

Reading Fourth and Eighth Grades

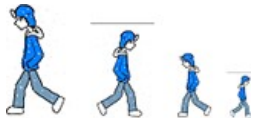
In 2024, the National Center for Education Statistics (NCES) administered the National Assessment of Educational Progress (NAEP) reading assessment to representative samples of fourth- and eighth-grade students in the nation, states, the District of

Columbia, Department of Defense schools, and 26 participating large urban districts. The 2024 reading assessment included literary and informational texts to assess students' reading comprehension skills. Students also answered survey questions about their opportunities to learn and their engagement with reading in and outside of school.

<https://bit.ly/3Ck0w8p>

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My Walking Thoughts



For Sunday February 2 2025

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Back Under the Bag Again

I had a different instructor for my second journey in the Cougar's canvas overcast. He was a former F4D Skyray driver who hated instructing dufuses like me in instrument stuff rather than out there in the fleet turning and banking the way 'the real guys' did. His name was Rhodes—I mean there really has to be someone with the name for the outfit to christen 'Dusty.'

That aside, Lt. Rhodes was a little guy who got his revenge on his assignment detailer by working to make me and my peers expel SOS, scrambled eggs, and oil-drenched potatoes into the creepy confines of the aft cockpit.

After he had me climb out west to 20 thousand feet without once pulling the attitude gyro's circuit breaker, he set us on a course to the north, then asked in a snarky voice, "Are you buckled in tight?" I was and said so.

"Ok, close your eyes tight and keep them that way until I tell you that you have the airplane." As covered in our preflight brief, he would establish the Cougar in what was called euphemistically "an unusual attitude, then leave it up to me to assess the situation and get us back to straight and level flight again on a northerly heading.

"No cheating," he advised me in an even more evil tone I took to mean, 'BOHICA.' (You don't know what that means?) Well no problem. Neither did I prior to that morning, but I was about to make it a treasured place in my trove of vile acronyms.

Set for the exercise with my eyes dutifully locked, I felt the bird roll into a left bank and heard the slipstream increase in pitch. After a bit I felt myself sink into the seat bucket

and the swishing sound diminished. After a couple more transients I couldn't define, he said almost conversationally, "You've got it."

I opened my eyes to an instrument panel devoid of any movement, the altimeter steady at 22 thou, wings level on the attitude gyro, airspeed locked in at 270 knots, vertical speed indicator steady at dead center... heading pegged at 360... what the hell?

I was mystified how had he managed to get all the gauges to show no movement, terrified that we were in some terrible situation and that I, without information from my flight instruments was powerless to resolve.

Then it came to me that Dusty was playing games and that we really were just straight and level, on course and altitude, so I just played along until he said, "I've got it," followed by "Eyes closed."

In future setups the disorienting maneuvers were more serious, so in response to his "You've got it," commands I found us in a variety of ridiculous—sometimes perilous—situations: nose high bleeding airspeed, nose pointed nearly vertically down with the machmeter heading for the 1.0 mark; upside down, in steep banks; each evolution requiring swift appreciation and appropriate response. By about the third of these I was getting to enjoy the tests, my pride growing with each success. But...

But you know what was waiting in the wings, don't you? Yeah, that magic circuit breaker, and the "You've got it," call with the airspeed falling through 80 knots with the attitude gyro showing us wing slightly down to the left, the nose just slightly above the horizon.

Then began a seriously flawed game of 'catch-as-catch-can,' in which I noticed altitudes ranging from a high of 24, down to somewhere around 6 thousand feet, airspeeds from zero (where I began my recovery) up to nearly 500 knots. All the other instruments with the exception of the frozen attitude gyro seemed content to travel from one extreme to another with no recovery in sight.

While I struggled to corral the beast, Lt. Rhodes remained silent—well I may have detected a cackle or two—until I finally brought all the gauges to rest... 9,500 feet, 260 knots, 160 degrees heading, and the automatic direction finder (ADF) needle pointed 30 degrees off the nose.

"Ok," the voice in my headset said with seeming satisfaction, "take us home."

Back on the deck, coffee cups in hand, Lt Rhodes led me back through what I have since thought of as Mr. Toad's Wild Ride.

"It was good you let the aircraft settle before yanking it into a spin, but you waited way too long before trying to level the wings."

What followed from his kneeboard notes was a catalog of lost opportunities where he began to worry he might have to take control. "But you hung in there," he said with some semblance of approbation. "You'll do better next time."

I groaned.

It was the last time I flew with him until the air-to-air gunnery stage near the end of my flight student career... a far happier time in both our lives.

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Next week we'll get to the 'down-and-dirty' portion of the Radio Instrument Stage, when Junior Birdman learns to fly, talk, navigate, and chew gum... if not at the same time, at least in an iterative fashion.

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