This Atlantic hurricane season is about to do something that hasn’t happened in 175 years

Last week, the Atlantic hurricane season blew through its traditional peak—which comes around September 10—with nary a tropical wave in sight, let alone a storm or hurricane.

This is remarkable. Usually this is the time of year when sea surface temperatures reach their warmest in the tropics, and with a favorable atmosphere it should be smooth skating for tropical systems. But this year, the main region where most tropical systems develop is choked with Saharan dust and wind shear.

No one is complaining. Landfalling hurricanes are incredibly destructive for coastal areas and have the potential for considerable inland rainfall. Even storms at sea, in the Gulf of Mexico, can send energy prices skyrocketing—the last thing needed this year.

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https://arstechnica.com/science/2026/09/this-is-by-far-the-most-peaceful-atlantic-hurricane-season-weve-ever-seen/

Some satellite companies still have an appetite for boutique launch services

If you ask most satellite companies aside from SpaceX, they will tell you the world doesn’t have enough capacity for launching payloads into orbit. This is despite the blistering launch cadence we’ve seen around the world in recent years, led by SpaceX’s Falcon 9 rocket.

Customers in any sector will, of course, usually welcome competition. Theoretically, competition will lead to lower prices and allow the best to rise to the top. It seems like the customers buying launch services were right. SpaceX is dialing back its Falcon 9 launch program, and there is no certainty about when SpaceX’s reusable next-generation super-heavy-lift rocket, Starship, will carry anything to orbit besides the company’s own Starlink satellites.

So it’s no surprise satellite operators are cheering the success of a new launch provider. This was especially the case a few days ago, when Germany’s Isar Aerospace reached orbit for the first time with its Spectrum rocket. The launcher delivered a batch of CubeSats to low-Earth orbit from a spaceport in northern Norway, and Isar tasted success after its first test flight ended in failure last year.

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https://arstechnica.com/space/2026/09/some-satellite-companies-still-have-an-appetite-for-boutique-launch-services/

Random rewards enrich classic game-theory contests

Games may be life with all the hard bits removed, but they provide a way to study why people make the choices they make. Traditional games are usually played against a static background: the rewards per outcome are constant. That limits their relevance to behavior because, in real life, the rewards and consequences of strategic choices are ever changing. Now, researchers have used a mathematical model to study a series of games that include evolving strategies and randomly varying returns.

A bit of history

Perhaps the most famous game-theory contest is the prisoner's dilemma. In the prisoner's dilemma, a pair of thieves have been captured and are being separately interrogated by the police. If both clam up, they will be punished for a lesser crime. If one prisoner makes a deal (defects) then that prisoner gets to go free and the other gets a heavier sentence. If both make a deal, they both get an in-between punishment.

The person running the game can start it with different rewards for cooperating and defecting to explore how the optimum strategy varies with reward and risk, which the players can figure out by varying the strategies across multiple rounds. Depending on the balance between the reward for staying silent (cooperating) and betrayal, the game stabilizes with everyone betraying everyone. In this simple situation, everyone loses.

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Trump’s forced coal plant extensions thrown out by judge

The use of coal to generate electricity on the US grid has been plunging for nearly two decades, and the first Trump administration was unable to affect the trend. So his second administration has attempted more aggressive interventions to prop up coal use. One of its most direct means of doing so is to order coal plants that were scheduled to close to remain open, even if there is no need for them.

The administration’s justification for these orders is a statute that allows the Department of Energy (DOE) to declare an emergency in the case of wartime or a sudden shortfall in generation. A number of parties, including states where coal plants have been slated to close, have challenged this declaration. And on Friday, in the first of these cases to make its way through the courts, the declaration was judged to be contrary to the statute. While this only affects a single coal plant in Michigan, the reasoning of the decision will apply to every coal plant closure that has been blocked by the DOE.

No emergency

The decision was issued by a unanimous three-judge panel from the DC Circuit's Court of Appeals. It focuses on the J.H. Campbell Generating Plant, which was scheduled to close last year but has been kept open by a total of five emergency declarations by the DOE, each limited to 90 days by the Federal Power Act. At issue was section 202(c) of that Act, which allows the DOE to declare emergencies when the US is at war or when "an emergency exists by reason of a sudden increase in the demand for electric energy, or a shortage of electric energy."

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Scientists unlock secrets of ancient Egyptian materials with proteomics

Credit: Museum of Mediterranean and Near Eastern Antiquities, Stockholm
Credit: Museum of Mediterranean and Near Eastern Antiquities, Stockholm
The precise composition of ancient Egyptian paints, binders, adhesives, and similar materials used to make artifacts is largely unknown, in part because a full analysis would require

taking samples that would damage those valuable artifacts. The development of cutting-edge, non-destructive techniques has been helping to unlock those secrets, aiding conservation efforts.

Most recently, researchers have used mass spectrometry-based proteomics to analyze the glues and adhesives in a broad set of Egyptian artifacts, according to a new paper published in the journal Science Advances. They found plenty of expected sources, such as animal collagens and egg proteins, but also plant proteins, specifically from sesame and drumstick tree (moringa) cereals.

As previously reported, the ancient Egyptians had a highly formalized (and easily recognizable) painting style, and there has been considerable interest in gaining insights into the specific pigments and painting techniques employed. Common pigments included hematite and realgar for red; goethite and orpiment for yellow; Egyptian blue; Egyptian green; carbon-based black; and calcite, gypsum, anhydrite, and huntite for white. (Just last year, Washington State University researchers were able to re-create Egyptian blue by mixing together silicon dioxide, copper, calcium, and sodium carbonate in varying proportions and heating them at very high temperatures akin to those of ancient kilns.)

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What happens when quantum mechanics and relativity meet?

Almost a hundred years ago, physicists theorized out what free fall should do to a quantum wave. If the solution they came up with is wrong, quantum mechanics and Einstein's theory of gravity flatly contradict each other. But testing it has been impossible because nobody has managed to build an interferometer that could perform the necessary measurement.

Now, a team led by Ron Folman, a physicist at Ben-Gurion University of the Negev, with collaborators in Germany, the UK, and the US, including Nobel laureate Roger Penrose, has done it. They built a new interferometer that gives a single atom two possible paths at once: one that involves a free fall, and another where it is held perfectly still. Both paths end at the same place at the same moment, allowing the team to measure what the fall does to a wave-like property of the atom.

Long time coming

Ever since Galileo, physicists have known how to describe a falling object—where it is, how fast it goes, or how quickly it accelerates. Quantum mechanics, though, insists that every object is also a wave. "Every particle, doesn't matter if it's a car or a spaceship or an atom, is a wave," Folman says. "Everything that is a wave, like sea waves or sound waves, goes up and down. And if you're up or down, this is measured by something called a phase. A phase just tells you if you are at the top of the wave or at the bottom."

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Physicist does the math on Star Trek's "Picard maneuver"

It turns out Jean-Luc Picard was an even better starship helmsman than the writers knew. A physicist has gone through the details of a warp-speed trick from the first season of *Star Trek: The Next Generation* and found a subtlety the show missed. But instead of a plot hole, the detail he found actually makes the maneuver more impressive… as well as a great opportunity to teach about a lesser-known feature of the theory of relativity.

Níckolas de Aguiar Alves, a physicist at the Federal University of ABC in Brazil, first watched *Next Generation* as a master's student. When he got to the episode "The Battle" in the show's first season, the plot reminded him of his relativity coursework.

In "The Battle," a Ferengi leader reminds Picard of a battle he fought years ago as captain of a ship called the *Stargazer*. Under fire from a mysterious attacker, Picard's ship's shields were down. He had to get closer without taking a hit, so he made a gamble. Picard ordered the *Stargazer* to charge the enemy ship at warp speed (meaning faster than light), then stop abruptly and fire. By going faster than light, Picard anticipated that the other ship would see two images of the *Stargazer*: where it reached warp speed and where it stopped. If they fired on the wrong image, they would miss the

Stargazer, and Picard could win the battle.

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When it comes to Beatles references, scientists can’t let it be

Scientists have an indisputable playful side, evidenced by frequent allusions to popular culture in their research publications. That includes popular song lyrics. And the most popular musical group, in terms of how frequently their songs and lyrics appear in the scientific literature, is The Beatles, according to a new paper published in the journal PLoS ONE.

“Some of these are genuinely brilliant,” said co-author Gabriel Budel of Delft University of Technology in The Netherlands. “‘The lung and winding road’ is a paper on Long COVID that changes one vowel of the more than 3,000 references they found to The Beatles. ‘Here comes the SU(N)’ turns ‘Here Comes the Sun’ into a quantum computing paper about mathematical groups. Someone was having a very good day at their desk.”

Back in 2014, scientists at the Karolinska Institute in Sweden revealed that they had been deliberately inserting Bob Dylan lyrics into their papers as part of a long-running bet,

starting with a 1997 Nature review entitled “Nitric Oxide and inflammation: The answer is blowing in the wind.” That resulted in a 2015 study on whether Dylan lyrics appeared elsewhere in the biomedical literature; the most frequently referenced were “The Times They Are A’Changin'” and “Blowing in the Wind.”

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https://arstechnica.com/science/2026/09/scientists-really-love-to-reference-the-beatles-in-their-work/

Update to Google’s AI weather model improves forecast accuracy

Google is one of the major players in AI (meaning machine learning) weather forecast model space. The models it and others generate have their strengths and weaknesses, but the main advantage is that they can have forecast performance similar to traditional models while requiring far less computing horsepower to run. That means they can be run more frequently.

Google recently released version 3 of its WeatherNext model, with the biggest change being that it now ingests some satellite weather data, shortening the lag time between current weather conditions and generating a new forecast. The update is detailed in a white paper.

Reanalysis

Many weather models make use of what’s called a “reanalysis,” which is a sort of model of its own. Reanalyses take in all kinds of weather data and combine them into a single, consistent global snapshot of the atmosphere. That requires that they provide estimates for conditions over locations without real-world measurements, because weather forecast models need to work with a global picture.

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The secret to protecting next-gen spacecraft might be eggshells

In 2007, a piece of space debris punched a bullet-like hole through the radiator panel of the US space shuttle *Endeavor*. The shuttle program ended in 2011, but the space debris problem has only intensified as we launch more and more satellite constellations, telescopes, and spacecraft into orbit. That’s why Chinese scientists have devised a new aluminum material inspired by eggshells that they believe could offer enhanced protection against debris fragments, according to a new paper published in the Journal of Applied Physics.

Eggshells have long fascinated scientists because of their mechanical properties. For instance, it’s well known that cracking an egg requires applying just enough force to the center to achieve a clean break without completely shattering the shell. In 2012, MIT mechanical engineer Pedro Reis co-authored a paper demonstrating the link between an egg’s ovoid geometry and its rigidity, a major factor when predicting how much force an object can endure before cracking. (As I wrote for Slate at the time, rigidity is related to, but distinct from, strength. If one eggshell has tiny cracks and the other doesn’t, both shells have different strengths—the cracked one will break more easily—but the same rigidity.)

Reis started studying eggshells after participating in a popular physics demonstration: walking on cartons of eggs without breaking them. The key, he learned, was to align the eggs with their narrow tip (the most crack-resistant part) pointing up, and then carefully place one’s feet to distribute one’s weight over the entire surface area. This ensures that no single egg is overloaded. While it takes around 5.5 pounds of force to crack an egg, that depends on the direction in which the force is applied, as well as its distribution over the shell’s surface.

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