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**AI**  
**What it Means to Be a Mathematician When AI Does the Math. Researchers debate motivation, purpose, and the field's future**



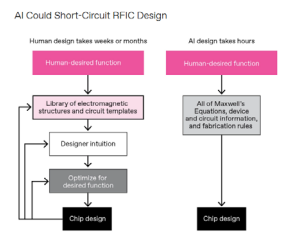
"For decades, computation has accelerated mathematical progress. This began 50 years ago, when mathematicians used a computer to prove the four-color theorem, which asks whether any map can be colored using no more than four colors, with no adjacent regions sharing the same color. The answer is yes, and the computer proved it, controversially, by checking 1,936 cases in a way no human could realistically verify.

Yet throughout this computational era, even in proofs relying on massive computational resources, the role of the human mathematician has remained central. Humans propose conjectures, guided by intuition. They devise strategies to prove them, guided by creativity and experience. And humans verify whether those proofs are correct.

Now AI is challenging the status quo. In just a few years, large language models (LLMs) have evolved from "stochastic parrots," capable of little more than regurgitating basic mathematics scraped from the internet, into advanced mathematical reasoning machines."

Source: [IEEE Spectrum](#) (25 June 2026)

**AI**  
**AI Is Designing Radio Chips That Humans Couldn't Even Imagine**



**Summary**

- RFIC design is a complex "dark art" that limits progress in wireless technologies like 5G, autonomous vehicles, and satellite communications.
- Princeton researchers use reinforcement learning and inverse design to rapidly create RFICs from scratch.
- Diffusion models rapidly generate novel or human-interpretable RF layouts, achieving record performance and drastically reducing design time.
- Future progress needs large, shared chip design datasets and open ecosystems so AI can learn universal electromagnetic and circuit behaviors.

Source: [IEEE Spectrum](#) (24 June 2026)

**AI**  
**AI Is Learning to Read the Room. Tech that senses human emotions is becoming aware of context**



"Imagine sitting down at your desk and logging in for a performance review, with an AI system analyzing the conversation. You've been working long hours, balancing deadlines, and your manager asks how you're doing. You say you're fine, and maybe even smile, but there's a hint of hesitation and your voice wavers. As you shift your posture, your shoulders slump.

These are subtle cues that to the human eye might hint at underlying stress. But to an AI model that's been trained only to categorize emotions as "happy" or "sad," such nuances are likely lost. It logs the words and a smile and moves on—and unless your human manager intervenes, the fact that you're tired, unfocused, and maybe a couple of days from burnout never enters the equation.

"Emotion AI," which estimates how people feel based on facial expressions, voice tone, and behavior, seems to be suddenly everywhere; it's being used in employee well-being and recruitment interviews, education platforms, and driver-monitoring systems. Technology call-center platforms such as NiCE and Genesys use AI to detect when a customer sounds frustrated and prompt agents in real time to slow down or respond with more empathy. Giant companies like Meta and startups such as Hume AI are developing more-expressive voice AI systems that can detect emotional cues in the person they're "talking" to and adjust how they communicate."

Source: [IEEE Spectrum](#) (23 June 2026)

**ARCHITECTURE**  
**Rewilding the City: 6 Unbuilt Projects from the ArchDaily Community**

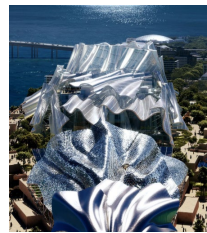


"In the current context of rapid urban environmental changes, such as heatwaves and droughts, new priorities are emerging in the design of public spaces. "Rewilding" refers to the practice of restoring self-sustaining ecosystems through the reintroduction of biodiversity, implementing strategies to reverse the effects of habitat loss, species decline, and ecosystem degradation. These strategies can be identified in this selection of conceptual projects submitted by ArchDaily readers, where architecture is used as a tool to restore ecological balance among species, inverting its modern role as an agent of ecological disruption.

Faced with the reality that climate change is making cities increasingly unlivable, citizens are confronted with the choice of either leaving or transforming their environments. The unbuilt projects compiled in this article offer transformative alternatives for more livable cities, combining construction, architectural, and landscape design strategies across urban parks and suburban interstitial spaces. As ecological laboratories, they incorporate a multispecies perspective into the design process, adopting a concept of time better suited to the development of ecosystems."

Source: [Archdaily](#) (22 June 2026)

**ARCHITECTURE**  
**Abu Dhabi reveals plans for Frank Gehry-designed performing arts venue**



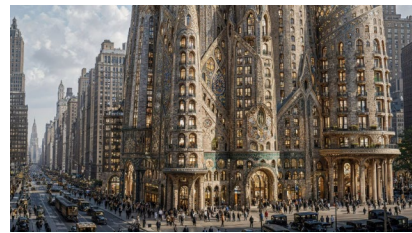
"Construction has commenced on Dar al Funoon Abu Dhabi, a performing arts venue designed by Canadian-American architect Frank Gehry before his death, Abu Dhabi's Department of Culture and Tourism has announced.

Expected to be completed in 2030, the landmark venue will be located on Saadiyat Island, joining Gehry's Guggenheim Abu Dhabi, which is also under construction.

Dar al Funoon Abu Dhabi will host opera, ballet, theatre and other live performances and be one of the final completed buildings designed by the celebrated architect, who passed away aged 96 in December last year.."

Source: [Dezeen](#) (26 June 2026)

**ARCHITECTURE**  
**Eight imaginative buildings with curving brickwork**



"From a sculptural reading space to a turreted mausoleum, our latest roundup gathers curvy brick buildings where skillfully laid brickwork is shaped into fluid forms.

**Works**

- Twisted Brick Shell Library, China, by HCCH Studio
- The Anthill, India, by Kaushal Tatiya Architects
- W-Mission Headquarters, South Korea, by Behet Bondzio Lin Architekten and BCHO Architects
- A Serpentine, UK, by Lanza Atelier
- Haikou Gaoxingli Insun Cinema, China, by One Plus Partnership
- The Scoop, UK, by Corstorphine & Wright
- Shah Muhammad Mohshin Khan Mausoleum, Bangladesh, by Sthapotik
- GJG House, Belgium, by BLAF Architecten

Source: [Dezeen](#) (28 June 2026)

**AUGMENTED REALITY**  
**Shadow-Free Augmented Reality Makes Illusions More Realistic Users had trouble distinguishing real versus projected text**



"In spatial augmented reality, light is projected onto surrounding objects to manipulate their appearance. The idea isn't new, but researchers are now finding more and more sophisticated ways of taking the technique to the next level. Most recently, one group in Japan has developed an immersive augmented reality system that reduces blur, nearly eliminates shadows, and overall boosts users' perception that the projections are realistic.

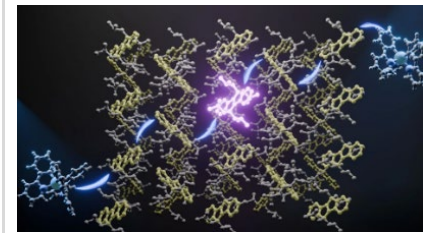
They describe their system in a study published in the May issue of IEEE Transactions on Visualization and Computer Graphics.

Projection mapping is a form of spatial augmented reality whereby projectors overlay digital images directly onto physical surfaces or objects, allowing users to see an altered reality without the need to wear a head-mounted display. While this kind of technology is great for entertainment purposes, it is also being explored for applications such as remote collaboration, health care, industrial design, urban planning, art creation, and office work.

"In many cases, the goal is not simply to display an image, but to change how a physical object appears—for example, its color, texture, or material properties,"..."

Source: [IEEE Spectrum](#) (26 June 2026)

**MATERIALS**  
**New solid-state material converts sunlight into higher-energy UV light**



"Imagine pouring together two cups of warm water and somehow ending up with a cup of boiling water. That cannot happen in everyday life, but at the quantum level, something similar is possible. Multiple low-energy particles of light can combine their energy to create a single particle with much higher energy.

Researchers at Kyushu University have now created a solid-state molecular material capable of converting visible sunlight into ultraviolet (UV) light under normal outdoor conditions. The new material achieves a photo upconversion efficiency of 1.9%, according to a study published June 23 in Nature Communications.."

Source: [Kyushu University](#) (25 June 2026)

## QUANTUM

### A tiny diamond defect could reveal a mysterious new kind of magnetism



"For decades, scientists recognized only two major types of magnets.

One is the familiar ferromagnet, the kind found in refrigerator magnets and countless everyday devices. The other is the antiferromagnet, whose magnetic properties are hidden at the atomic level but have attracted growing interest because of their potential use in advanced technologies.

"More recently, researchers identified a third category known as altermagnets. First proposed within the last decade, these materials may combine some of the most useful characteristics of both ferromagnets and antiferromagnets, potentially opening the door to faster, more energy-efficient electronics.

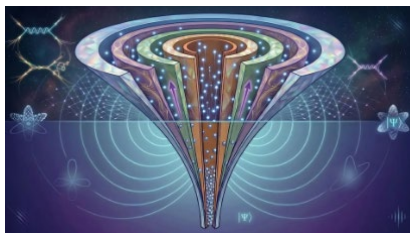
Now, physicists at the University at Buffalo have proposed a new quantum sensing approach that could make altermagnets much easier to identify.

The proposed method, described in Physical Review Letters, would detect how a suspected altermagnet affects a tiny magnetic defect inside a nearby diamond. By monitoring how the defect's magnetic signal relaxes over time, researchers may be able to identify telltale signs of altermagnetism."

Source: [University at Buffalo](https://www.buffalo.edu/news/2026/06/23/diamond-defect-reveals-new-kind-of-magnetism) (23 June 2026)

## QUANTUM

### Physicists create a strange new quantum state called a fractional fermi sea



"Researchers have shown that an unusual class of quantum states known as "fractional Fermi seas" can be deliberately created, according to a new study published in Physical Review Letters. The work was carried out by the Nägerl group together with theoretical physicist Alvise Bastianello of CNRS and Université Paris-Dauphine.

The study demonstrates how a new critical phase of matter can emerge when quantum particles are pushed far from their normal equilibrium conditions. Using ultracold cesium atoms confined to one dimension, the researchers repeatedly altered how strongly the particles interacted with one another. The resulting state goes beyond the behavior predicted by the well-known Tomonaga-Luttinger liquid theory, a cornerstone for understanding one-dimensional quantum systems.."

Source: [University of Innsbruck](https://www.innsbruck.ac.at/en/news/2026/06/29/fractional-fermi-sea) (29 June 2026)

## SUSTAINABILITY

### Hawaii is turning ocean plastic and fishing nets into roads



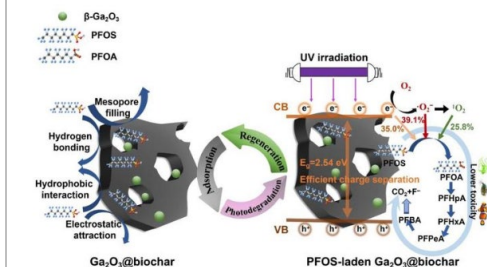
"Hawaii faces a growing plastic waste challenge. Recycling on the islands is expensive and difficult, and large amounts of marine debris continue to wash ashore or remain in surrounding waters. Now, researchers are exploring an innovative solution by turning discarded fishing nets and household plastic waste into asphalt for roads. Early results suggest the approach could provide a practical new destination for plastics that might otherwise end up in landfills or the ocean.

"This work investigates whether it's responsible to use recycled plastics in Hawaii's roads," shares Axworthy. "By reusing plastic waste that is already in Hawaii, we can reduce the environmental and economic impacts of transporting waste plastics from the islands, incinerating it or dumping it in Hawaii's overflowing landfills." "

Source: [American Chemical Society](https://www.chemicals.gov/newsroom/2026/06/28/hawaii-plastic-roads) (28 June 2026)

## SUSTAINABILITY

### A biochar-based "concentrate and destroy" strategy offers new hope for removing PFOS from water



"Perfluorooctane sulfonate, or PFOS, is one of the most persistent members of the PFAS family of "forever chemicals." Widely detected in groundwater, surface water, and drinking water sources, PFOS is difficult to remove because of its extremely strong carbon-fluorine bonds and high chemical stability. Now, researchers have developed a new biochar-based material that not only captures PFOS from water, but also helps destroy it through light-driven reactions.

In a new study published in Biochar, a research team led by Prof. Yanyan Gong from Jinan University and Prof. Dongye Zhao from San Diego State University reports a novel  $\beta$ - $\text{Ga}_2\text{O}_3$ -functionalized biochar, called  $\text{Ga}_2\text{O}_3$ @biochar, designed for a practical "concentrate and destroy" approach. The material first adsorbs PFOS from water, concentrating the pollutant onto its surface, and then uses ultraviolet light to trigger photocatalytic degradation of the captured PFOS.. "

Source: [Shenyang Agricultural University](https://www.sciencedirect.com/journal/biochar) (30 June 2026)

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