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6G

Researchers Make Breakthrough in Semiconductor Technology Set to Supercharge 6G Delivery

"Self-driving cars which eliminate traffic jams, getting a healthcare diagnosis instantly without leaving your home, or feeling the touch of loved ones based across the continent may sound like the stuff of science fiction.

But new research, led by the University of Bristol and published today in the journal Nature Electronics, could make all this and more a step closer to reality thanks to a radical breakthrough in semiconductor technology.

The futuristic concepts rely on the ability to communicate and transfer vast volumes of data much faster than existing networks. So physicists have developed an innovative way to accelerate this process between scores of users, potentially across the globe.

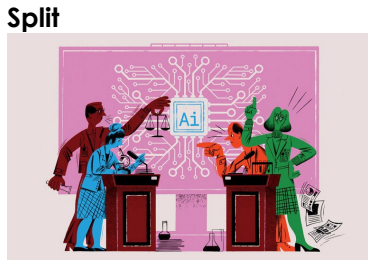
Co-lead author Martin Kuball, Professor of Physics at the University of Bristol, said: "Within the next decade, previously almost unimaginable technologies to transform a wide range of human experiences could be widely available. The possible benefits are also far-reaching, including advances in healthcare with remote diagnostics and surgery, virtual classrooms and even virtual holiday tourism.

"In addition, there is considerable potential for advanced driver assistance systems to improve road safety and industrial automation for greater efficiency. The list of possible 6G applications is endless, with the limit just being human imagination. So our innovative semiconductor discoveries are hugely exciting and will help drive forward these developments at speed and scale."

Source: Bristol (22 May 2025)

AI

Is It OK For AI To Write Science Papers? Nature Survey Shows Researchers Are Split



"How much is the artificial intelligence (AI) revolution altering the process of communicating science? With generative AI tools such as ChatGPT improving so rapidly, attitudes about using them to write research papers are also evolving. The number of papers with signs of AI use is rising rapidly (D. Kobak *et al*. Preprint at arXiv https://doi.org/pkhp; 2024), raising questions around plagiarism and other ethical concerns.

To capture a sense of researchers' thinking on this topic, Nature posed a variety of scenarios to some 5,000 academics around the world, to understand which uses of AI are considered ethically acceptable.

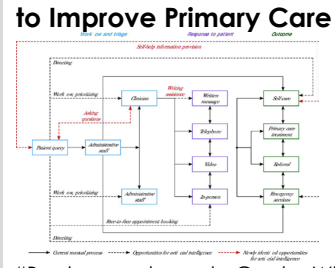
The survey results suggest that researchers are sharply divided on what they feel are appropriate practices. Whereas academics generally feel it's acceptable to use AI chatbots to help to prepare manuscripts, relatively few reports actually using AI for this purpose — and those who did often say they didn't disclose it.

Past surveys reveal that researchers also use generative AI tools to help them with coding, to brainstorm research ideas and for a host of other tasks. In some cases, most in the academic community already agree that such applications are either appropriate or, as in the case of generating AI images, unacceptable. *Nature*'s latest poll focused on writing and reviewing manuscripts — areas in which the ethics aren't as clear-cut."

Source: Nature (14 May 2025)

AI

Patients And Staff Identify Opportunities for Artificial Intelligence to Improve Primary Care eVisits



"Background and Goal: While remote or electronic visits (eVisits) can increase access to health care for certain groups of patients, their use can increase staff workload and patient demand. Artificial intelligence (AI) may mitigate these outcomes. This study explored the views of staff and patients in primary care to inform the development of artificial intelligence (AI) features for eVisits.

Study Approach: Researchers conducted interviews and focus groups with 16 primary care staff and 37 patients from 14 primary care practices in northwest England and London. Researchers asked interviewees about their views on the potential uses of AI during eVisits, risks, benefits, and challenges to its adoption into clinical practice. Transcripts were thematically analyzed to identify key themes.

Main Results:

- Initial misconceptions and reservations: both groups were unsure what AI could or could not do. Patients worried that AI might diagnose or prescribe without input from their physician, and staff questioned safety.
- Perceived benefits included faster responses for patients and lighter workload for staff if AI handled routine tasks. Perceived risks included depersonalized care, data-privacy fears, and the possibility that patients would have to enter symptoms perfectly for AI triage to work safely."

Source: EurekAlert! (27 May 2025)

AI

AI's Green Thumb: Agritech Apps Are Providing Personalized Advice to India's Small Farmers

"India is a deeply agrarian society with roughly 65 percent of the population involved in agriculture. Thanks to the "green revolution" of the 1960s and 1970s, when new crop varieties, fertilizers, and pesticides boosted yields, the country has long been self-sufficient regarding food—an impressive feat for a country of 1.4 billion people. It also exports more than $40 billion worth of foodstuffs annually. But for all its successes, the agricultural sector is also highly inefficient.

That's why, in 2018, India's national government identified agriculture as one of the areas of focus of its AI strategy. Since then, India's burgeoning agritech sector has changed how farmers operate. This paper outlines many of the developments and remaining challenges as AI is leveraged.

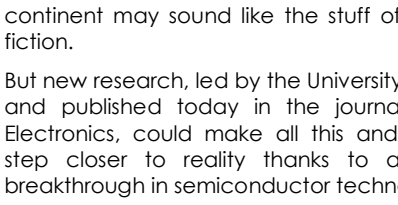
Many startups use AI and digital technologies to provide bespoke farming advice and improve rural supply chains. The government recently announced roughly US$ $300 million in funding for digital agriculture projects. With considerable government support and India's depth of technical talent, there's hope that AI efforts will lift the country's massive and underdeveloped agricultural sector.

It's a heavy lift: water shortages, a rapidly changing climate, disorganized supply chains, and difficulty accessing credit make every growing season a calculated gamble for farmers. The hope is that new AI-powered tools can take some of the unpredictability out of the endeavor. However, experts also caution that technology is not a panacea and say that without careful consideration, the disruptive forces of innovation could harm farmers as much as they help."

Source: IEEE Xplore (30 Apr 2025)

AI

With Evolutionary AI, Scientists Find Hidden Keys for Better Land Use

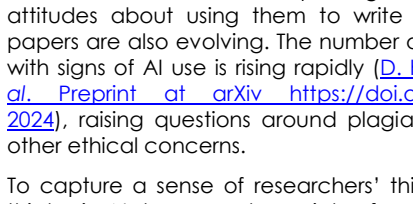


"Using global land use and carbon storage data from the past 175 years, researchers at The University of Texas at Austin and Cognizant AI Labs have trained an artificial intelligence system to develop optimal environmental policy solutions that can advance global sustainability initiatives of the United Nations. The AI tool effectively balances various complex trade-offs to recommend ways of maximizing carbon storage, minimizing economic disruptions and helping improve the environment and people's everyday lives, according to a paper published today in the journal Environmental Data Science.

The project is among the first applications of the UN-backed Project Resilience, a team of scientists and experts working to tackle global decision-augmentation problems—including ambitious sustainable development goals this decade—through part of a broader effort called AI for Good. University of Texas at Austin computer scientist Risto Miikkulainen, who helped launch Project Resilience, believes the new AI approach, initially focused on land use, can address an even larger set of challenges, from infectious diseases to food insecurity, with artificial intelligence potentially discovering better solutions than humans."

AI

AI Chip Developed for Decentralized Use Without the Cloud



"A new AI chip developed at the Technical University of Munich (TUM) works without the cloud server or internet connections needed by existing chips. The AI Pro, designed by Prof. Hussam Amrouch, is modelled on the human brain. Its innovative neuromorphic architecture enables it to perform calculations on the spot, ensuring full cyber security. It is also up to ten times more energy efficient.

The professor of AI processor design at TUM has already had the first prototypes produced by semiconductor manufacturer Global Foundries in Dresden. Unlike conventional chips, the computing and memory units of the AI Pro are located together. This is possible because the chip applies the principle of 'hyperdimensional computing': This means that it recognizes similarities and patterns, but does not require millions of data records to learn.

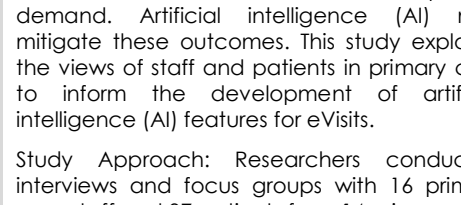
Instead of being shown countless images of cars, as with the deep learning method used in conventional AI chips, this chip combines various pieces of information, such as the fact that a car has four wheels, usually drives on the road, and can have different shapes. Like the new chip, explains Prof. Amrouch, 'humans also draw inferences and learn through similarities.'

An important advantage of brain-like thinking: it saves energy. For the training of a sample task, the new chip consumed 24 microjoules, while comparable chips required ten to a hundred times more energy - 'a record value,' notes Prof. Amrouch. 'This mix of modern processor architecture, algorithm specialization and innovative data processing makes the AI chip something special.'

This also sets it apart from all-rounders like the chips from industry giant NVIDIA. 'While NVIDIA has built a platform that relies on cloud data and promises to solve every problem, we have

ARCHITECTURE

From Smart to Intelligent: Evolution in Architecture and Cities



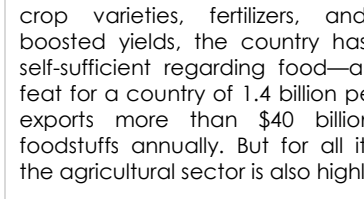
"The limits of our design language are the limits of our design thinking". Patrik Schumacher's statement subtly hints at a shift occurring in the built environment, moving beyond technological integration to embrace intelligence in the spaces and cities we occupy. The future proposes a possibility of buildings serving functions beyond housing human activity to actively participate in shaping urban life.

The architecture profession has long been enamored with "smart" buildings - structures that collect and process data through sensor networks and automated systems. Smart cities were heralded to improve quality of life as well as the sustainability and efficiency of city operations using technology. While smart buildings and cities are still at a far reach, these advancements only mark the beginning of a much more impactful application of technology in the built environment. Being smart is about collecting data. Being intelligent is about interpreting that data and acting autonomously upon it.

The next generation of intelligent buildings will focus on both externalities and the integration of advanced interior systems to improve energy efficiency, sustainability, and security. Exterior innovations like walls with rotatable units that automatically respond to real-time environmental data, optimizing ventilation and insulation without human intervention are one application."

CLIMATE CHANGE

Thousands Of Animal Species Threatened by Climate Change, Novel Analysis Finds



"A novel analysis suggests more than 3,500 animal species are threatened by climate change and also sheds light on huge gaps in fully understanding the risk to the animal kingdom.

The study(Link is external) was published today in BioScience.

"We're at the start of an existential crisis for the Earth's wild animals," said Oregon State University's William Ripple, who led the study. "Up till now, the primary cause of biodiversity loss has been the twin threats of overexploitation and habitat alteration, but as climate change intensifies, we expect it to become a third major threat to the Earth's animals."

Ripple, distinguished professor of ecology in the OSU College of Forestry, and collaborators in the U.S. and Mexico used publicly available biodiversity datasets to examine animal data for 70,814 species from 35 existing classes. They categorized the species by class and climate change risks as assessed by the International Union for Conservation of Nature.

The researchers found that at least one-quarter of the species in six different classes are threatened by climate change; these classes include arachnids and chilopodans (centipedes) as well as anthozoans and hydrozoans (marine invertebrates related to jellyfish and corals). Smaller percentages of other classes' species are also directly at risk from a warming climate.

"We are particularly concerned about invertebrate animals in the ocean, which absorbs most of the heat from climate change," Ripple said. "Those animals are increasingly vulnerable because of their

Source: utexas (19 May 2025)

developed an AI chip that enables customized solutions. There is a huge market there."

Source: TUM (19 May 2025)

Source: Archdaily (26 May 2025)

limited ability to move and promptly evade adverse conditions."

Source: Oregonstate (20 May 2025)

DESIGN

What On Earth Is Regenerative Design?

"I'm an industrial designer. We make physical products. This means extracting Earth's resources and turning them into objects that, in most cases, won't return to the natural system no matter how well-intentioned our process. Even with all the circularity strategies in our hands, we still impose irrevocable change on our natural living system.

Yes, product design is woefully behind on sustainable design, but at least most people broadly understand what it means. We have a way to go in getting to grips with the frameworks, metrics and acronyms; LCAs, SDGs, Scope 1, 2, 3s, and there is work to be done in making them more accessible to designers with an aversion to spreadsheets and a lack of reliable data sources.

But, if we stop quibbling over the nuanced definitions, we know the top-level goal of sustainability: reduce carbon, reduce waste, reduce resource extraction, keep materials in circulation. However, ask 30 different designers to define regenerative design, and you'll get 30 different, often contradictory, answers.

What on earth is regenerative design? We wanted to understand how regenerative design can apply to our work at Morrama, so we started with seeking a definition.

Engineering and architecture firm Arup describes it as "an approach in which human and natural systems are designed to co-exist and co-evolve over time". But this gives us zero indication of how regenerative design might be applied."

Source: Dezeen (22 May 2025)

DRONES

Engineering Smarter Drones: From Nature to Complex Aerial Manipulation

""I was walking my dog and watching a squirrel jump from tree branch to tree branch," says David Saldaña, an assistant professor of computer science and engineering at Lehigh University. "I started thinking about how quickly the animal has to adapt to the different properties of each branch and to the forces generated by their movement. And that's when the idea hit me—how could we get robots, especially aerial robots, to adapt like that?"

Saldaña, who leads the SwarmsLab, recently received nearly $600,000 in funding through the National Science Foundation's Faculty Early Career Development (CAREER) Program to answer that question. His research will explore how to expand the capabilities of aerial robots so they can manipulate and transport flexible objects such as cables, rods, hoses, and plastic sheets. Potential applications could range from construction and disaster response to industrial automation.

The prestigious NSF CAREER award is given annually to junior faculty members across the U.S. who exemplify the role of teacher-scholars through outstanding research, excellent education, and the integration of education and research. Each award provides stable support for a five-year period.

Currently, aerial robots are limited to manipulating rigid objects, like boxes, because the dynamic and unpredictable forces associated with flexible materials present unique challenges.

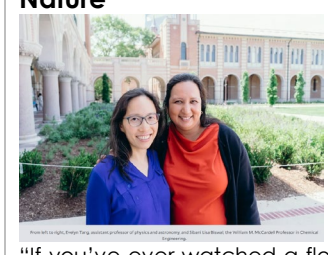
"For example, if you want to grab an apple from a tree branch, the branch will generate a force against you," says Saldaña. "As humans, we're naturally able to respond to those forces, but it's still a big problem for robots. We want them to learn how to adapt to and compensate for them."

To do that, Saldaña and his team are developing a novel methodology that integrates control systems and reinforcement learning to maintain stability, enable fast learning, and ensure time-critical recovery."

Source: Eurekalert! (27 May 2025)

MAGNETIC FIELDS

Invisible Currents at The Edge: Rice Research Team Shows How Magnetic Particles Reveal a Hidden Rule of Nature



"If you've ever watched a flock of birds move in perfect unison or seen ripples travel across a pond, you've witnessed nature's remarkable ability to coordinate motion. Recently, a team of scientists and engineers at Rice University discovered a similar phenomenon on a microscopic scale, where tiny magnetic particles driven by rotating fields spontaneously move along the edges of clusters driven by invisible "edge currents" that follow the rules of an unexpected branch of physics. The research was published in the journal Physical Review Research.

"When I saw the initial data — with streams of particles moving faster along the edges than in the middle — I said 'these are edge flows!' and we got to work exploring this," said corresponding author Evelyn Tang, assistant professor of physics and astronomy. "What's very exciting is that we can explain their emergence using ideas from topological physics, a field that became prominent due to quantum computers and exotic materials."

In their experiments, the team suspended superparamagnetic colloids — think tiny magnetic beads about a hundred times smaller than a grain of sand — in salty water. They then applied a rotating magnetic field, which caused the particles to form crystals in different shapes: Sometimes they formed dense circular clusters, and other times they spread out in sheets with empty holes or "voids."

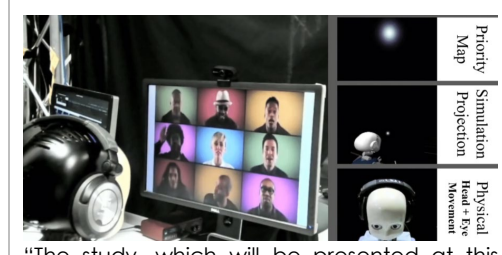
The experiment got especially interesting when the particles along the outer edges of these shapes started to move faster than the rest, forming a kind of conveyor belt around the border.

"We call this edge flow," said co-first author Aleksandra Nelson, a former postdoctoral fellow in Tang's lab. "It is basically a current that forms naturally around the boundary without anyone pushing it."

Source: Rice (19 May 2025)

ROBOTS

Robots Learning Without Us? New Study Cuts Humans From Early Testing



"The study, which will be presented at this year's IEEE International Conference on Robotics and Automation (ICRA), introduces a new simulation method that lets researchers test their social robots without needing human participants, making research faster and scalable.

Using a humanoid robot, the research team developed a dynamic scanpath prediction model to help the robot predict where a person would look in a social setting. The model was tested using two publicly available datasets, and the researchers demonstrated that humanoid robots were capable of mimicking human-like eye movements.

Social robots are designed to interact with people using speech, gestures, and expressions, making them useful in education, healthcare, and customer service. Examples of social robots also include Pepper, a retail assistant, and Paro, a therapeutic robot for dementia patients.

The research team matched how their model worked in the real world to that of a simulated one, projecting human gaze priority maps onto a screen to compare the robot's predicted attention focus with real-world data. This allowed for direct evaluation of social attention models in realistic conditions, reducing the need for large-scale human-robot interaction studies in the early phases of research."

Source: Surrey (21 May 2025)