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HORACE MANN'S TECH TREND JOURNAL

From The Editor

Dear Reader,

Welcome to the second 2025-2026 issue of Futurem!

This issue covers how AI is rewriting our financial and data systems, how nanotechnology is being used in medicine and biometric authentication, the transformation of science fiction into reality, and current uses of sustainable technology.

Futurem has grown enormously this year, and I am incredibly grateful to all the contributors and editors who volunteered their time and ideas. Special thanks to Ms. Bahr, Ms. Feng, and Sr. Dalo, for their continued support.

As always, stay curious, stay critical, and most importantly—stay ahead of the trend.

Happy reading!



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2026 Mid-Year Tech Trend Review

HOW AI IS REWRITING THE FUTURE OF THE FINANCE INDUSTRY

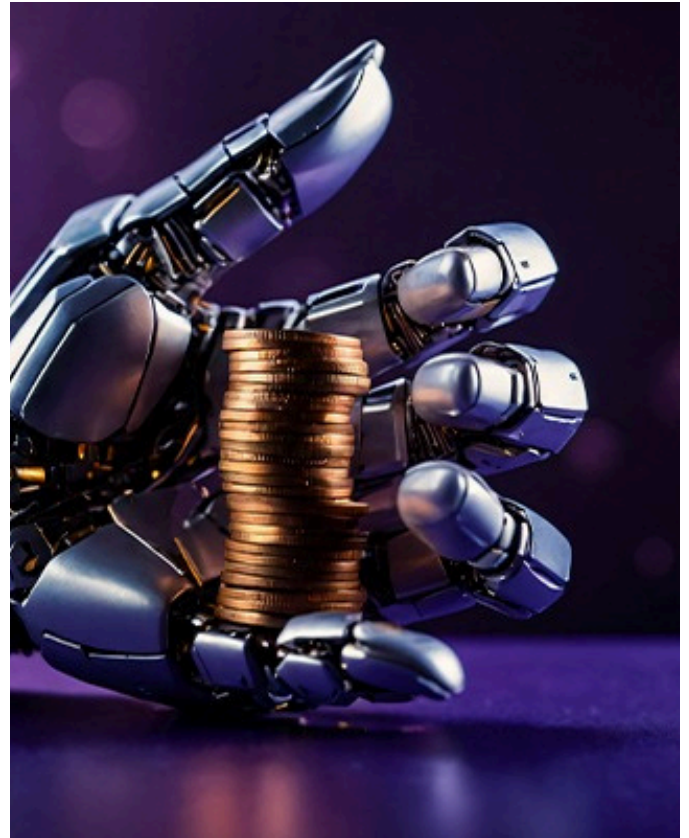
BY EMILY LI

One of the essential and influential sectors of the global economy is the finance industry, and it is currently being changed and affected like never before because of the development of AI. Many university graduates and young adults who are searching for careers aspire to work in the finance industry because of its prestige and growth opportunities. The workforce, how businesses operate, and the tools needed are now being largely affected by what AI can contribute.

Because the finance industry is data driven, artificial intelligence is being integrated to combat fraud and increase efficiency. For example, automated roles in finance such as

customer service help, document reporting, and accounting that are now being taken over by AI, because it is more error-free and takes up less time. Business operations say that assigning artificial intelligence to these jobs can help their employees focus on other strategic activities and high-value tasks.

Consequently, workers in the finance industry now have to develop skills to be able to make decisions with AI systems and interpret AI outputs. Their efforts are still necessary because ethical decisions are essential even with AI being able to do many automated tasks. Currently, we cannot completely trust AI in doing everything, so we need humans to be able to regulate AI to provide the most beneficial outcomes.



The banking sector, a subset of the finance system, is a key component that is experiencing major changes from AI. In this sector, they have been developing advanced business models to help with risk management and drive innovation in finance advisory. AI is improving customer satisfaction by helping personalize financial products to improve the experience of their clients. An example is Bank of America integrating AI into their system to provide customers with personalized investing strategies to improve customer engagement.

Cybersecurity is also heavily impacted by the integration of AI.

AI-powered systems are more vulnerable to cyber threats because cybercriminals can target vulnerabilities in AI models and manipulate and change training data. In addition, AI's complexity can make it difficult to discover these security vulnerabilities. On the other hand, AI can also enhance security and help fight against cyber attacks. AI systems can detect abnormal patterns signaling cyber threats, and can also have incident responses to less sophisticated cyber threats. Today, AI being used in finance to protect against cyber threats is evolving and improving to help with long-term security.

Major companies in the finance industry have made significant incorporations of AI, such as EY and Deloitte. EY.ai launched in September of 2023 and invested 1.4 billion to help transform outcomes using AI. EY.ai combines EY's technology platforms and AI capabilities to help other businesses globally. It specializes in transactions, transformation, risk, insurance and tax. This platform has been helping transform banking to use the potential of AI

securely and functionally. Deloitte launched an Enterprise AI navigator, which helps leaders leverage AI to deliver measurable results. This application reduces the time for usual AI design work, helping companies become more efficient. It helps decide which AI investments can bring the most value and results. Scaling is a crucial part of being able to successfully integrate AI into a company. The operating models that the Enterprise AI navigator

provides ensures business leaders can view how processes evolve at scale. The incorporation of AI brings anxiety and worries to other jobs as AI continues to become more advanced and the careers of finance corporate services seem in jeopardy. However, AI does open opportunities for new fields in the business industry. AI model developers and engineers, AI auditors and compliance specialists, and AI-enhanced investment

analysts help guide AI instead of relying on them, and can help businesses further their advancement in the technology evolving world. In conclusion, as others aspire to join the finance industry, knowing how AI is impacting and changing the finance industry can help you focus on how to prepare yourself for the new future of finance.

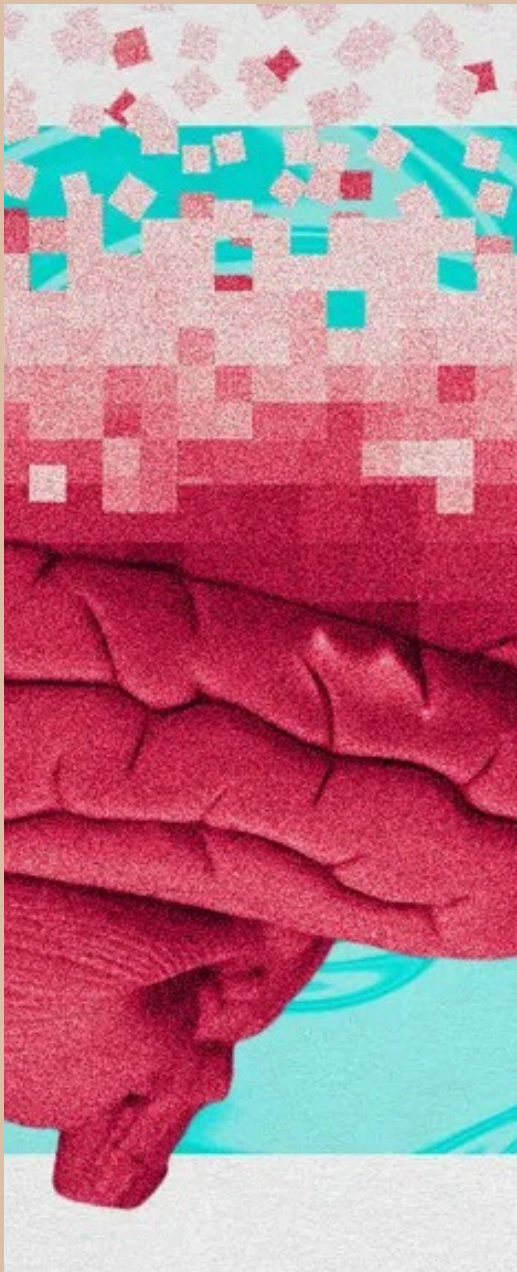


ARE HUMANS TRAINING AI

OR BY AI

OR

IS AI TRAINING HUMANS?



In the spring of 2025, 15-year-old Maya opened TikTok for a quick study break. She had been watching videos of sea otters and baking for weeks, and her feed reflected that—soft colors, cute animals, and delicious treats. She liked it that way. But over the next month, the AI algorithm subtly pushed her toward study motivation videos, then exam hacks, then college admissions advice. By summer, her once relaxing feed had become an unbroken loop of high-pressure success stories.

She hadn't searched for any of it. She just scrolled. "I feel like the app knows me better than I know myself," she said. "It's like it figured out who I am before I did."

Maya's words will feel familiar to many social media users. But they also raise a question we rarely ask: are we training AI, or is AI training us?

We like to think of humans as AI's teachers, feeding it data, correcting its errors, and helping it grow. But in an age where algorithms quietly curate our news, entertainment, shopping, and even friendships, what if the truth is, we are the students?

Just like an AI learns from the data it's fed, humans are shaped by the information they consume. If that "data" is algorithmically selected for maximum engagement rather than truth or to show the whole picture, our world quietly shrinks without us even noticing.

AI recommendation systems were built to maximize engagement. In doing so, they have transformed from reflecting our choices to training our minds, shaping how we think, what we value, and even who we become.

“They don’t care how it affects people,” said a recommendation system engineer at a major social media company, who asked not to be named, “they just want you hooked.”

Twitter’s (now X) friend recommender system similarly found it tended to connect politically similar users, creating clusters where people mostly interacted with like-minded accounts (Duskin et al., 2024).

The *Frontiers in Psychology* journal calls this the “Algorithmic Self,” the version of you shaped by continuous feedback from AI (Joseph, 2025). At first, it reflects your preferences. But as recommendation engines and predictive models feed not just what to watch or read, but subtly how to think and feel, it begins to define them.

Recommendation systems like TikTok’s “For You Page” work by predicting the next video based on your past behavior and the behavior of people similar to you, then engaging you with more of the same content. After Maya watched a few study-hack clips, the system grouped her with similar teens, and suddenly she found herself trapped in a feed of college advice videos she never asked for.

“TikTok uses a lot of clever behavioral signals like how long have you stayed watching a video and AI to quickly create a map of your preferences and then serve you up very, very compelling videos,” said behavioral scientist Kristen Berman, CEO and co-founder of Irrational Labs, a firm that helps tech companies use behavioral design to track user behavior and optimize engagement. In a 2025 interview, she warned that humans, “regardless of their intellect or willpower, will likely fall to the algorithm” (Nesterak, 2025).

Major tech platforms hire psychologists and behavioral scientists trained in persuasive technology to study and exploit human attention and keep users coming back (Lieber, 2018). “They don’t care how it

affects people,” said a recommendation system engineer at a major social media company, who asked not to be named, “they just want you hooked.”

The process creates filter bubbles, narrowing the range of perspectives and topics you encounter. Sometimes, these bubbles are benign, growing a new interest in wildlife photography. But other times, they can push people toward more extreme content, creating echo chambers that amplify a single worldview.

A 2023 study of Chinese short-video platforms Douyin and Bilibili found that recommendation systems reinforced homophily, meaning users mostly saw content from people similar to them (Gao et al., 2023). An audit of

The consequences can be subtle. A teen might start dressing a certain way because it’s trending on their algorithmically curated feed. Or they might suddenly start craving vibrant, chewy Swedish candy or hunting down the pistachio-cream-stuffed Dubai chocolate bar because they keep seeing them on TikTok.

And sometimes the shift is profound. Extremist groups have exploited recommendation tools to recruit followers, starting with harmless content and gradually drawing them toward more polarizing material. In fact, Facebook’s own internal research in 2016 found that 64% of people who joined extremist groups on the platform did so because its algorithm suggested them (Shuster et al., 2021).

The psychological effects extend beyond politics. A Baylor University study found that the rise of short-form videos recommended by AI was associated with higher anxiety, shorter attention spans, and a loss of deep focus among heavy users, habits, and thought patterns shaped by the very platforms people believe they're in charge of (Craine, 2023). Another study found that users on these AI algorithmic feeds made more impulsive decisions, had trouble experiencing pleasure from everyday activities, and showed worsened memory and emotional regulation over time (Liu et al., 2025).

The real danger isn't just misinformation or polarization; it's the slow erosion of identity. When the data we see is chosen for us, our thoughts, preferences, and values get nudged into conformity, until...we eventually think alike. We stop being the authors of our own stories and become data points, optimized not for independence but for predictability.

AI ethics researchers argue that recommender systems reduce human complexity to a few measurable traits and then exploit them for engagement. Without structural change, the drift toward homogenized thought will only accelerate.

Many experts call for diversifying information sources, requiring AI algorithmic transparency, and stronger regulation. However, these changes are unlikely to happen voluntarily, which is why government intervention or regulations to prioritize public well-being over profit are essential.

And since AI algorithms are unlikely to disappear, a possible experiment could be an "algorithm-free week," where feeds are randomized rather than personalized by AI. Platforms could frame this as a trust-building measure that still preserves ad revenue. Without the algorithm shaping every scroll, users could discover interests, perspectives, and communities they'd never otherwise encounter.

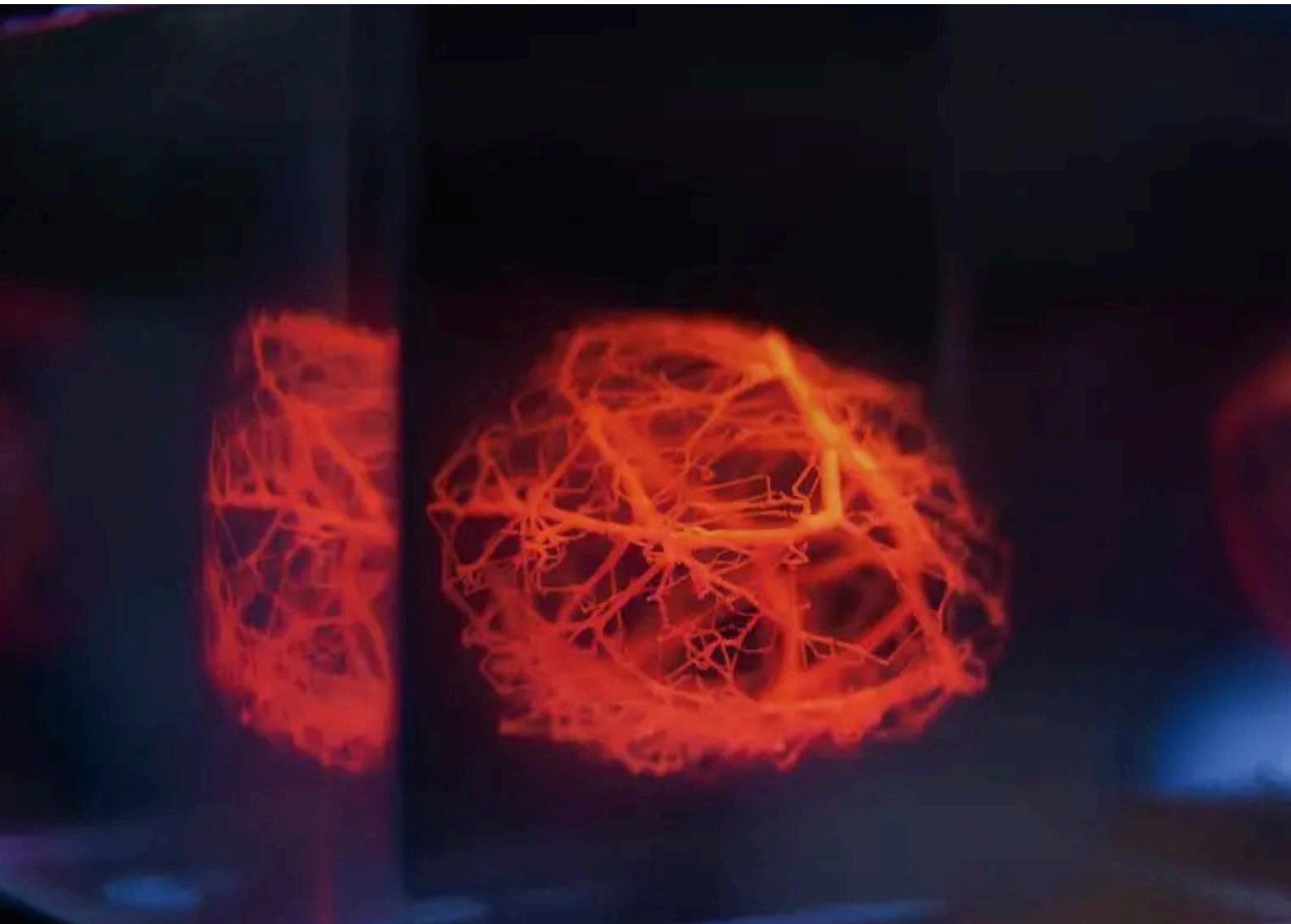
Back in Maya's bedroom, the TikTok feed scrolls on. Her once enjoyable study breaks now leave her anxious and drained. She insists she's just watching what she likes. But what she "likes" has quietly shifted, little by little, toward a version of herself that didn't exist before the algorithm built it.

*If our mental software
is being updated daily
without our consent, we
have to ask:*

*At what point do we
stop being the
authors of our own
minds?*



HOW NANOTECHNOLOGY COULD REVOLUTIONIZE THE ORGAN TRANSPLANT INDUSTRY



BY SOFIA CAFAGNA

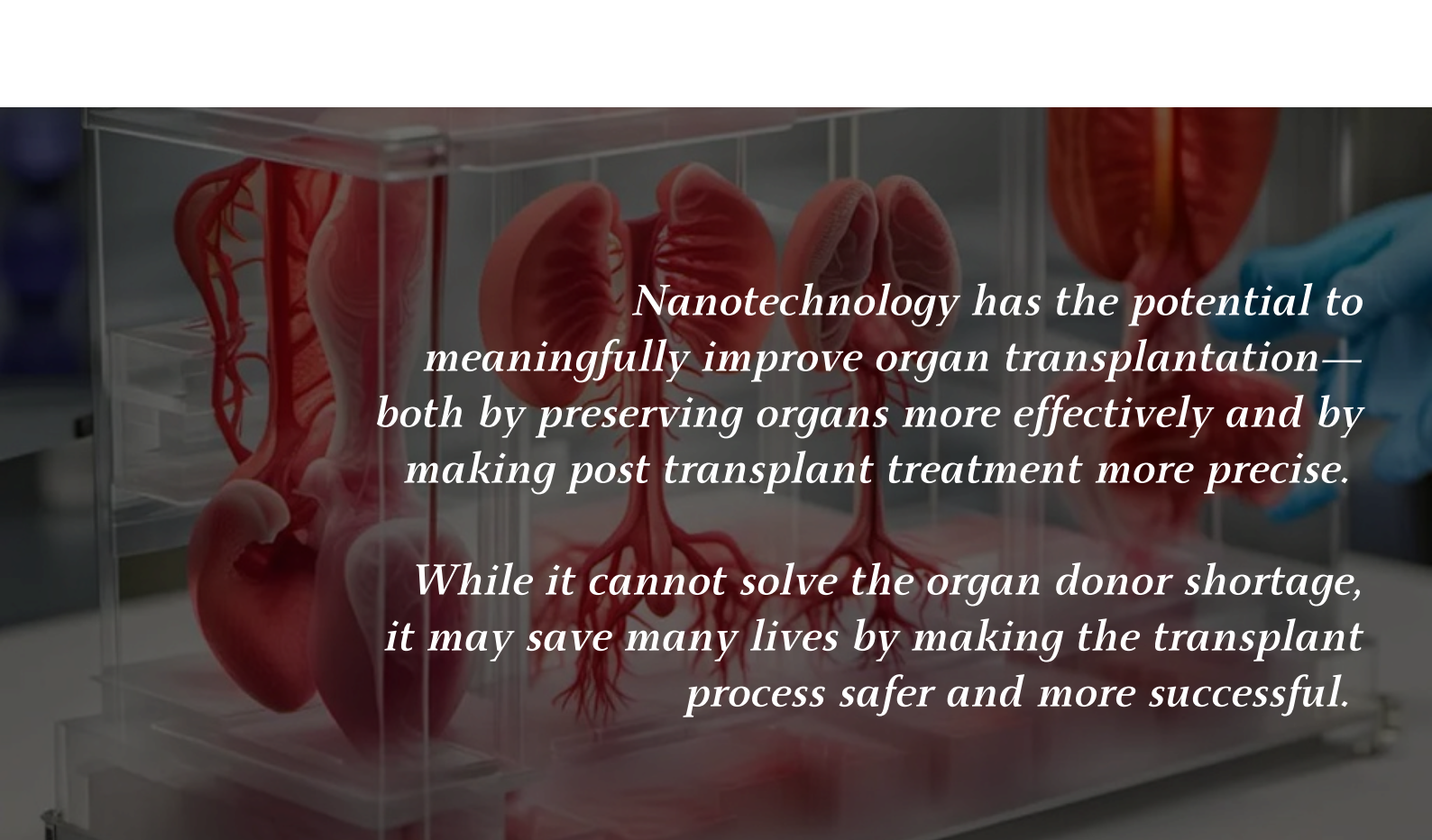


atoms—a concept known as tunability. The arrangement of particles also plays a critical role in determining a substance's properties. Because the structure of a substance determines how electrons are distributed and how atoms interact, the arrangement of atoms can vastly shape its physical and chemical properties. Diamonds and graphite are a great example. Both are made out of carbon, yet they are completely different materials. Diamonds have a rigid tetrahedral structure in which each carbon atom is equidistant from the others, while graphite consists of carbon arranged in flat layers. This stark contrast illustrates just how much atomic structure affects a substance's properties.

Nanotechnology is the manipulation of matter at an extremely small scale. When the quantity of particles decreases, their characteristics—such as melting point, electromagnetic properties and chemical reactivity—can frequently change. For instance, gold is a noble metal, meaning it

is not very chemically reactive in bulk form. However, when gold is broken down into much smaller particles, its surface area to volume ratio increases significantly, making it much more reactive. This means scientists can fine-tune the properties of elements simply by working with fewer

Nanotechnology takes these ideas and manipulates atoms to fine-tune their properties, giving scientists new materials with new characteristics to work with. This opens up applications across fields like engineering, medicine, and science, including the organ transplant industry.

An anatomical model of human organs, including the heart, lungs, and kidneys, is displayed in a laboratory setting. The organs are mounted on a clear plastic stand and are surrounded by various laboratory equipment and containers. The background is slightly blurred, showing a typical laboratory environment.

Nanotechnology has the potential to meaningfully improve organ transplantation—both by preserving organs more effectively and by making post transplant treatment more precise.

While it cannot solve the organ donor shortage, it may save many lives by making the transplant process safer and more successful.

The main challenges in organ transplantation are finding a viable donor, preventing the host body from rejecting the donated organ, and managing an increased risk of infection caused by post-transplant medicine. Despite significant technological and medical advances and its benefits, organ transplants remain out of reach for many patients. The core issue is supply and demand: although the number of organ donors has doubled over the past 30 years, demand has grown to six times what it was three decades ago. As a result, roughly 4,000 people die each year while waiting for a transplant. In 2021 alone, 11,129 people died on the waiting list.

While nanotechnology cannot create new organs, it can help improve organ preservation to ensure that very few organs are lost to time. Currently, heart and lung grafts can only survive 10 hours outside the body, while kidneys last just 24 to 36 hours. Many organ grafts also suffer from inadequate preservation—since all cells depend on blood and oxygen supplied by the body, reduced circulation during preservation leads to impaired organ grafts. Scientists are now developing new preservation methods with the help of nanotechnology. Currently, organs are flushed of

blood and stored in sterile, ice-filled containers. One emerging approach involves cooling organs to sub-zero temperatures, effectively pausing their biological clocks. However, this method presents two significant challenges:

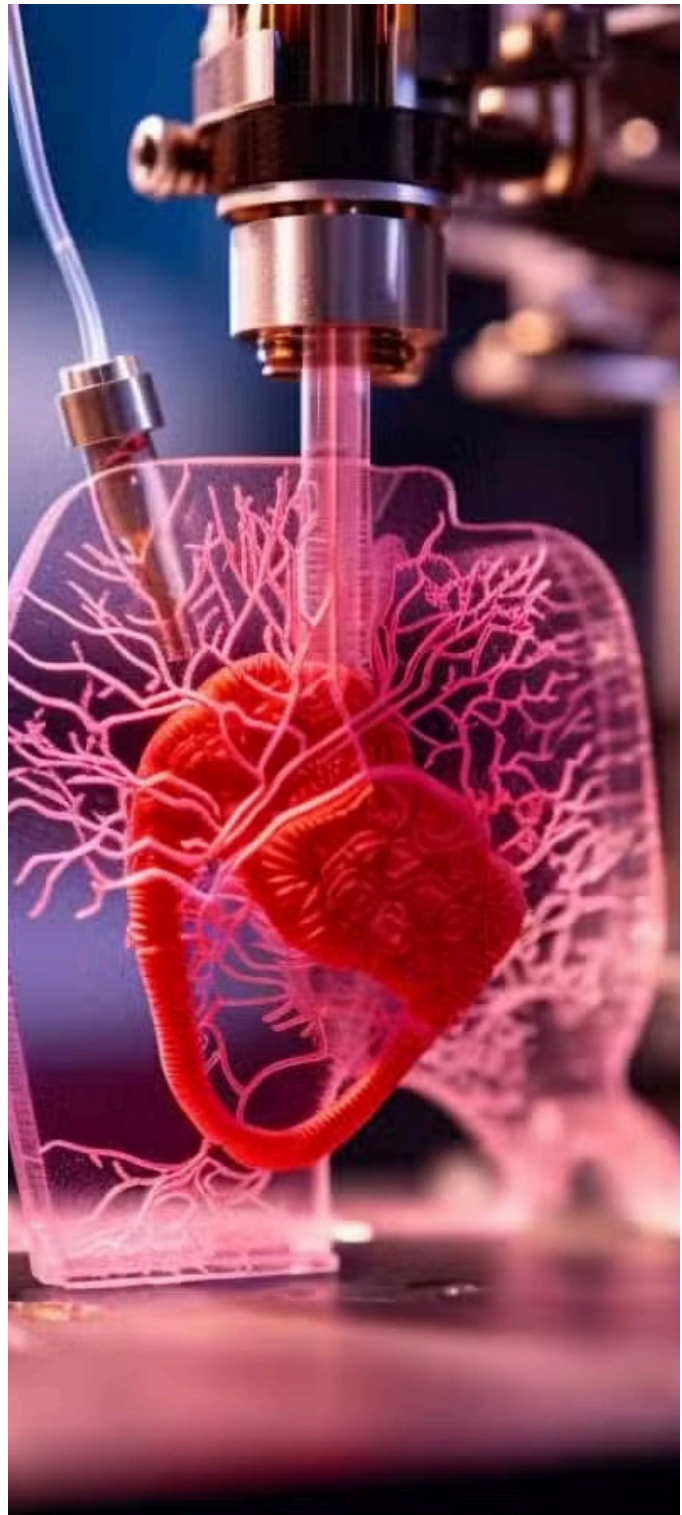
1. During the cooling process, ice can form within large organs, causing them to crack and damage cells.
1. When reheating the organ, scientists must restore it to a safe temperature quickly and uniformly; otherwise, ice crystals can form and render the organ unusable.

Nanotechnology can help with the second problem. At the University of Minnesota, scientists are developing magnetic nanowires—extremely thin, small wires that rapidly generate heat when exposed to a magnetic field. In practice, these nanowires would be distributed within the organ, traveling through blood vessels to ensure even distribution. When it is time to reheat the organ, scientists would expose the nanowires to a magnetic field, producing heat quickly and uniformly for a safe and efficient reheating process.

After transplantation, another major obstacle is organ rejection. The immune system often identifies a newly transplanted organ as foreign and attacks it. To prevent this, patients must take immunosuppressant drugs at precise intervals. While immunosuppressants have significantly improved survival rates for transplant patients, their effectiveness varies from person to person, and long-term use weakens the entire immune system. Scientists are therefore exploring more targeted, personalized treatments using nanotechnology.

One approach involves using nanoparticles as drug carriers, delivering immunosuppressants directly to the transplanted organ rather than suppressing the immune system throughout the entire body. This could make treatment more precise and reduce the harmful side effects associated with long-term immunosuppressant use. Additionally, certain nanoparticles may enable doctors to detect early signs of rejection, allowing for faster intervention.

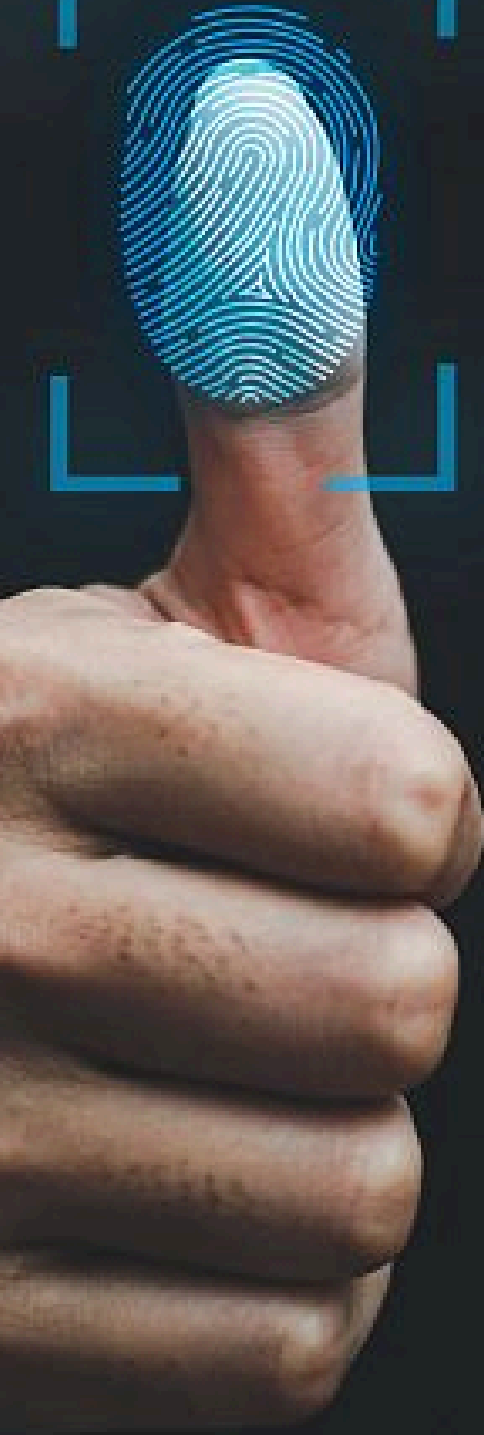
Overall, nanotechnology has the potential to meaningfully improve organ transplantation—both by preserving organs more effectively and by making post transplant treatment more precise. While it cannot solve the organ donor shortage, it may save many lives by making the transplant process safer and more successful. As research advances, nanotechnology could become an essential part of the future of organ transplantation.



Moving Beyond the Passcode

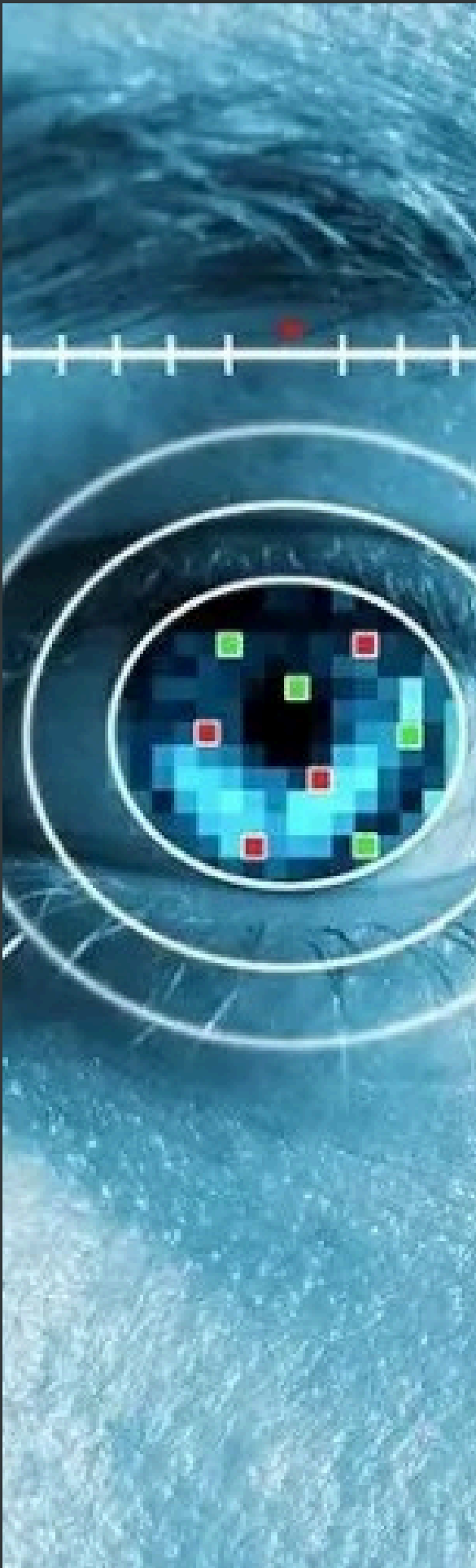
BIOMETRIC AUTHENTICATION

& ITS RISKS By Iris Zhang



In an age of fast-paced technology and relentless innovation, personal security has seen surprisingly little improvement over the years. Passcode systems on smartphones have remained largely the same for nearly 20 years, with only minor changes over time. However, this system is growing less and less reliable. New and upcoming inventions such as AI-enhanced thermal imaging—which relies on an artificial intelligence to detect the heat left by your fingers—makes people's smartphone privacy more vulnerable than ever. Studies have even shown that 45% of passcodes can be guessed in under one minute, and 59% are breached in under an hour (SecureList). This is mainly the result of increased refinement of these specific technologies, as information thieves now seek more than just a simple credit card. Personal data, identities, social security cards, etc., all are extremely valuable in gaining access to bank accounts and security systems.

So why hasn't Apple moved beyond passcodes? Well, they have. Features like Face ID and Touch ID are now common forms of biometric authentication. Back when Apple first introduced the Touch ID in September 2013, the chance of a random stranger unlocking your Apple device went from 1 in 10,000 to nearly 1 in 50,000 (Apple Support). That's a 500% increase in protection just by adding your fingerprint. Moreover, this chance also goes down significantly by adding more than one fingerprint to Touch ID (specifically 1 in 10,000 for five fingerprints). Then, we fast forward to November of 2017, when Apple made history by introducing a 3D-based facial authentication system known as Face ID. Using an A11 Bionic chip alongside machine learning to recognize changes in appearance, now, it is almost impossible to break into an iPhone (1 in 1,000,000 chance).



While passcodes are becoming less secure, biometrics offer a stronger yet often flawed solution.

Thus, if biometrics such as fingerprint or facial recognition really works so well, why isn't every major tech corporation using it then? To start, there are some ethical concerns to consider. Many people feel conflicted about whether it is really safe to store all our personal information and biometrics in these devices. Some users have expressed doubt around the true privacy of using biometrics, stating that just about anyone working in the company may have access to such data, which may include your voice, face, iris, and more. In addition, the actual security of using biometrics is still largely unknown. When a password is stolen, the user can always just reset it to another random, one-in-a-million combination. On the other hand, biometrics are unchangeable. You, as an individual, are born with these traits, and remain mostly unchanged for your entire life. As a result, if your fingerprint gets stolen, it would be compromised forever.

In conclusion, while passcodes are becoming less secure, biometrics offer a stronger yet often flawed solution. Therefore, the best way to navigate through this currently would be a thoughtful combination of both.

Nanotechnology & the Borg

SCIENCE FICTION MEETS AN EMERGING REALITY

By Sofia Cafagna

The Borg are villainous, cyborg humanoids often depicted as antagonists in the Star Trek Universe. The Borg are an alien race, whose origins are unknown but are notorious for an act known as 'assimilation.' Rather than reproduce, the Borg are composed of millions of species with cyborg implants. However, these species are not part of the Borg from their own free will. The Borg are feared for capturing unsuspecting planets or ships and 'assimilating' their crew. Their ships the size of planets tower over their opponents, relaying the same message: "Resistance is Futile." Once their victim has been captured, the Borg inject their victims with thousands of black, green nanoparticles which assimilate their body. The victim soon loses control of their freewill, and their body is reconstructed from the inside out with cyborg implants in an extremely painful process. Essentially, the victim becomes a disposable, irrelevant drone.

Despite this scary and once-thought ridiculous idea of nanotechnology and the Borg taking over our body, some concept of this may not seem so farfetched. Although the Borg are fictional, the concept of nanotechnology has become more and more advanced with its applications to medicine, with possibly malicious intentions, becoming increasingly prevalent in today's world.

Nanotechnology is essentially the manipulation of particles at a very small scale, based on the idea of tunability. When particles decrease in quantity, their properties, such as melting point and chemical reactivity, can often change.



For example, gold, in large amounts, does not react very easily with other substances. However, when gold is broken down into nanoparticles, much more of it is exposed to what is around it, which makes it much more reactive. This means that by simply using fewer atoms, scientists can fine tune the properties of an element, a concept known as tunability. Moreover, the way particles are arranged together can also greatly change their properties.

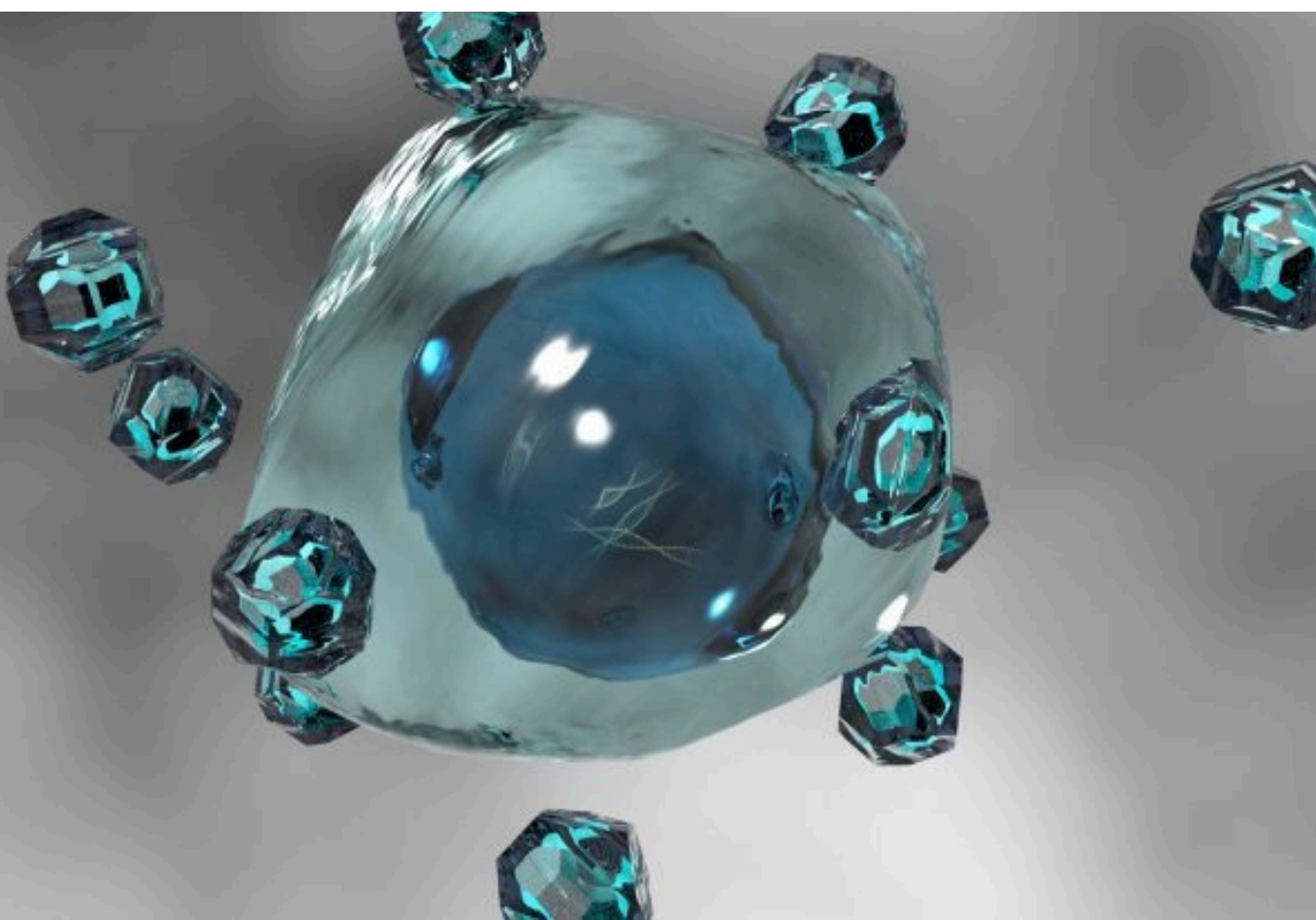
These concepts can then be applied to various fields, including nanomedicine.

Nanotechnology has proven very useful in diagnosing and treating certain illnesses such as cancer.

Similarly, the Borg have adapted to use this technology. After a victim is injected with millions of nanoprobes, the microscopic machines remain in the person's bloodstream. The purpose of the probes is to maintain their cyborg implants and repair any damage to tissue, as well as protecting the person from disease.

Many nanotechnology advancements have shown promise to be able to do these things that the Borg have used, including gene therapy. Gene therapy is a type of treatment in which scientists try to alter or replace genes inside the body in order to treat disease. One of the biggest challenges with gene therapy is getting the genetic material into the correct cells without harming the body. Nanoparticles can help solve this problem by acting as carriers, transporting genetic material to specific places in the body. In this way, nanotechnology can already be used to enter the body, interact with cells, and change how they function. This is similar to the Borg's nanoprobes, which also enter the bloodstream and begin changing the victim from the inside.

In addition, scientists are studying nanotechnology for tissue repair and fighting disease. Some nanoparticles can be designed to target cancer cells more precisely, while avoiding as much damage to healthy cells as possible. Other nanoparticles are being studied for their ability to help repair damaged tissue or improve how medicine is delivered throughout the body. This is what makes nanotechnology so powerful, but also somewhat unsettling. The same technology that can be used to heal the body could also theoretically be used to control it, alter it, or harm it if placed in the wrong hands. While modern science is nowhere near creating a Borg-like species, the general idea of microscopic technology entering the body and changing it is no longer just science fiction.



However, nanotechnology can be used to harm. This is where the comparison to the Borg becomes more unsettling. The Borg use nanoprobes to take away a person's control and change their body without consent. While real nanotechnology is not doing this, scientists have pointed out that nanoparticles can be designed to avoid the immune system. This can be very useful in medicine, but it also shows how the same

technology could be dangerous if it were used the wrong way. Even though nothing like Borg assimilation exists in real life, the idea of tiny technology entering the body without consent is no longer completely impossible. This is why ethics and regulation are so important as nanotechnology continues to advance.

Because of this, nanotechnology represents both promise and danger. In medicine,

it could help treat diseases that are currently very difficult to manage, improve drug delivery, and possibly repair tissue in ways that once seemed impossible. At the same time, science fiction like Star Trek reminds us that powerful technologies can also raise serious ethical concerns. The Borg are an extreme fictional example of what happens when technology strips people of their free will and humanity. Although

nanotechnology today is being developed for helpful reasons, the comparison to the Borg shows why society must be careful as this science continues to grow. In this way, nanotechnology and the Borg show how science fiction can sometimes reflect a future reality before the real world fully catches up.



Science fiction sometimes reflects a future reality before the real world fully catches up.

The Start of A New Tech Era

SUSTAINABLE TECHNOLOGY & ITS IMPACT ON COMPANIES & THE ENVIRONMENT



By Emily Li

Generative AI takes up seven or eight times more energy than a traditional AI computing software.



Not just we humans have been affected by growing technologies and AI, but the world we live in, the environment, is being severely impacted. Fortunately, many technology companies worldwide have been making efforts to improve the environment, including Apple, Google, and Microsoft.

Artificial intelligence, one of the upcoming and trending technologies, has been severely detrimental to the environment.

A large amount of electricity is needed to power generative AI because of the billions of parameters that need constant and repeating computing. It also requires performance computing infrastructure that consists of thousands of specialized chips that all run in parallel. These are used for training sessions that can take weeks, or months, using lots of energy just to train AI models leading to increased carbon dioxide emissions. In addition to electricity, a

lot of water is needed to cool the hardware used for generating AI model's training, deploying, and fine-tuning. A loss of water can affect nearby ecosystems and strain municipal water supplies. Generative AI takes up seven or eight times more energy than a traditional AI computing software. Examples of traditional AI computing software include recommendation engines used in Siri, Alexa, or Netflix. MIT scientists have approximated that in North America the power in data centers increased from 2688 megawatts at the end of 2022 to 5341 megawatts, and now it is expected to be 1050 terawatt-hours by 2026. For

reference, the amount of energy used in a typical AI-optimized hyperscale center uses as much electricity as 100,000 homes a year. The impact that generative AI has on power usage is clearly very large as AI becomes more integrated into our lives. In addition to generative AI using a lot more energy and power than traditional AI and web searches, generative AI also has a short shelf-life, meaning new models constantly have to be released. This data about the enormous power usage of AI shows the large amount of energy being used, creating implications on ecosystems around us with water usage, and creating a bigger carbon footprint.



AI is becoming a detriment to the environment as a whole, but humanity is fighting back. Apple is going to make its entire supply chain carbon neutral by 2030. Apple is doing this by requiring their global suppliers to use 100% clean energy to power production. The materials they are using are more low-carbon, like recycled aluminum and rare earth elements, therefore reducing emissions. Google is trying to go carbon-free by 2030, meaning it will run on 100% renewable energy. Microsoft is trying to be carbon negative by 2030. This means that they will remove more carbon than it emits. By 2050, Microsoft decided to eliminate all of its emissions, showing their deep investments in carbon removal. They are also charging business units for their carbon emissions, and using that money to invest into sustainability projects. Microsoft is clearly a strong advocate for sustainable and clean technology. The investments that these large tech companies have been making show how the future of sustainable tech is bright.



2026

Mid-year Tech Trend Review

AI SYSTEMS AND AGENTS

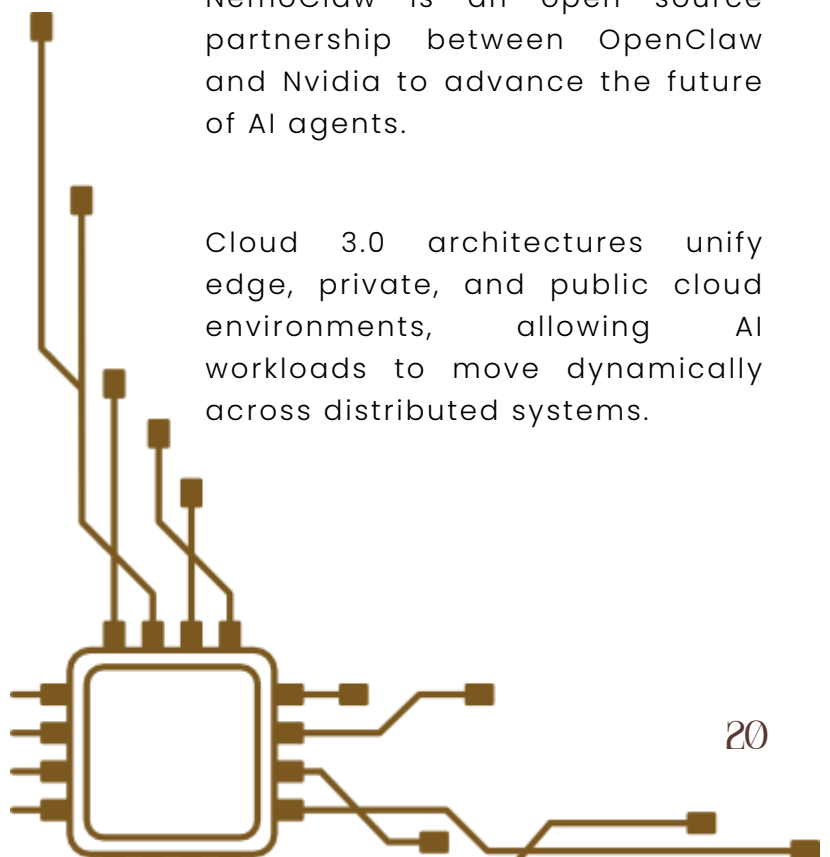
OpenClaw is an open-source autonomous AI agent that connects across apps and executes actions. Its modular “skills” architecture creates context-aware agents that are able to coordinate tasks across different platforms rather than isolated prompts.

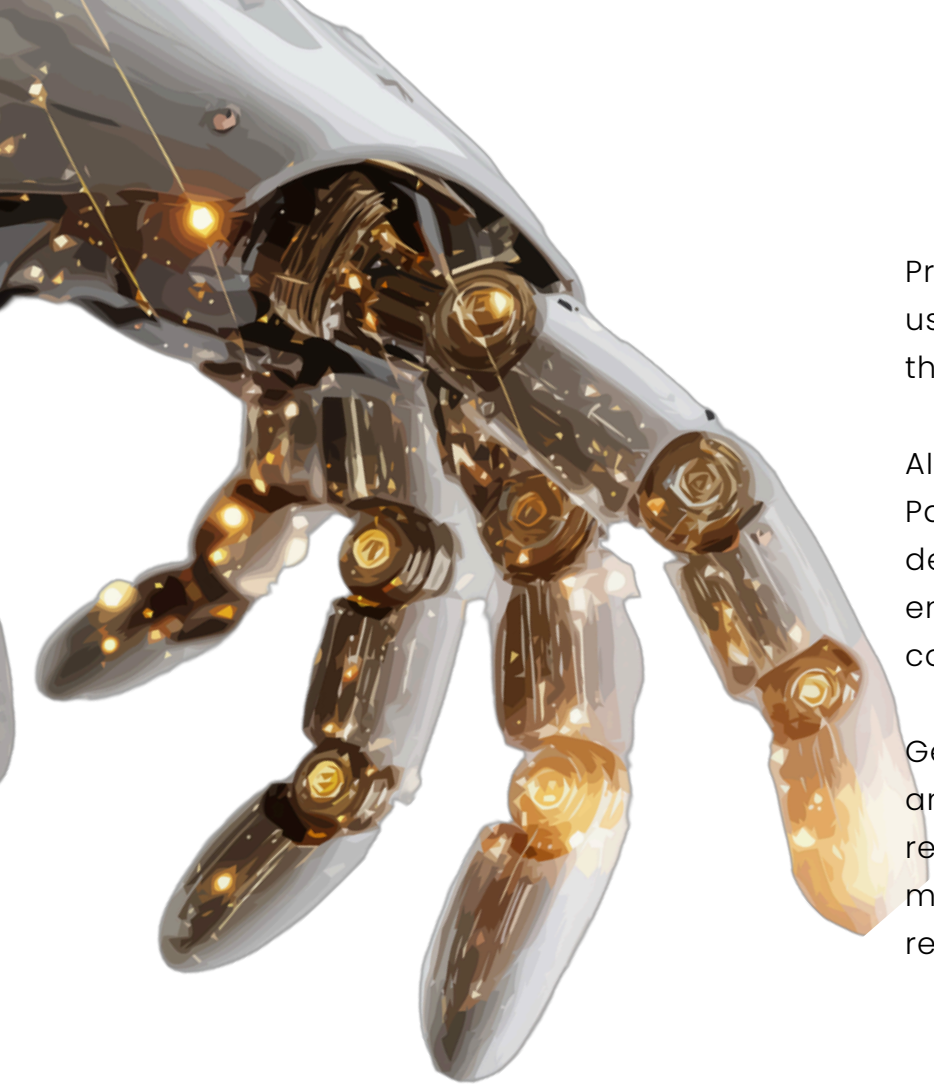
Agentic AI systems (Google Gemini Agents, Nvidia Nemotron) are enabling AI to plan, decide, and execute complex workflows independently across digital environments.

COMPUTE AND CHIPS

NemoClaw is an open source partnership between OpenClaw and Nvidia to advance the future of AI agents.

Cloud 3.0 architectures unify edge, private, and public cloud environments, allowing AI workloads to move dynamically across distributed systems.





CYBERSECURITY AND DIGITAL TEST

Preemptive cybersecurity systems use AI to predict and neutralize threats before they occur.

AI security platforms (CrowdStrike, Palo Alto Networks) automate detection and response in environments with increasingly complex threats.

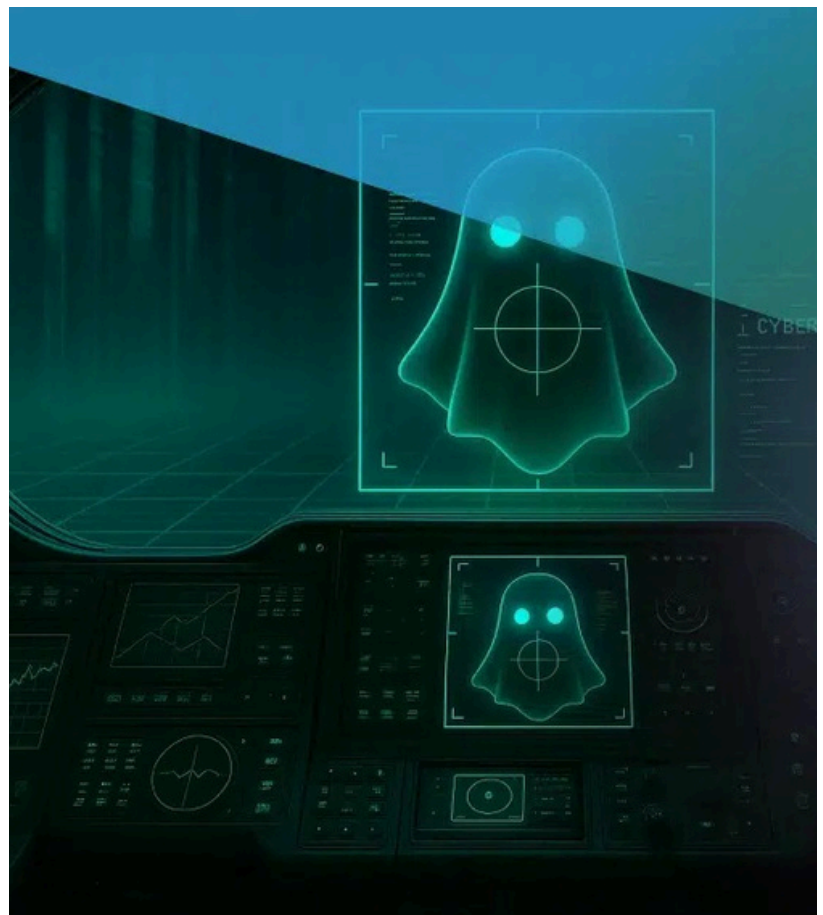
Geopatriation strategies shift data and workloads to sovereign or regional cloud providers to mitigate geopolitical and regulatory risk.

ROBOTICS AND PHYSICAL AI

Tesla Optimus humanoid robot represents progress toward general-purpose physical labor automation.

Figure AI is developing commercially deployable humanoid robots for logistics and industrial tasks.

Unitree Robotics builds agile, lower-cost robots that expand accessibility of advanced robotics.





ENERGY, CLIMATE, AND GREEN COMPUTING

Fusion energy breakthrough (ignition events where output exceeds input) represent progress toward scalable clean power.

Carbon removal technologies such as direct air capture plants are scaling to address atmospheric CO₂ at industrial levels.

Sodium-ion batteries are emerging as a lower-cost, more abundant alternative to lithium-ion energy storage.

QUANTUM COMPUTING AND ADVANCED SYSTEMS

Google's Echoes algorithm demonstrated verifiable quantum advantage by running specific computations thousands of times faster than classical systems

Advances in quantum error correction and photonics are improving stability and scalability of quantum systems



BIOTECH AND HUMAN-TECH

INTEGRATION

Brain-computer interfaces are enabling direct communication between the brain and the machines, with multiple companies advancing clinical trials

Neuralink has impacted devices in human patients, and Synchron, Paradromics, and Precision Neuroscience are advancing alternative BCI approaches

Columbia University researchers developed a single-chip BCI enabling wireless, high-bandwidth neural communication

SPACE AND OFF-EARTH EXPLORATION

Artemis II is the first crewed deep space-mission in over 50 years, testing systems required for sustained human exploration beyond Earth

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