MAY 2025 VOLUME 2

FUTUREM

HORACE MANN'S TECH TREND JOURNAL

BRIDGING AI & THEORETICAL PHYSICS

WOMEN AT MIT & THE FUTURE OF STEM

GENETICALLY-ENGINEERED WOLVES

BACK FROM EXTINCTION?

2025's MIDWAY TECH TRENDS

RIDING THE AI & AUTOMATION STORM

JOBS, SURVIVAL & THE FUTURE OF WORK

+

+

OURA RING: A REVIEW

FROM THE EDITOR

Welcome to the second issue of Futurem.

Since our first issue, the pace of technological change has only accelerated, but so has our commitment to exploring it. In this edition, we go deeper, focusing not just on the technical side of technology, but also the human side and how it impacts our daily lives.

In this issue, we will investigate how AI is changing the job economy, examine how theoretical physics and AI are interconnected in their development, explore the rising influence of wearables like the Oura Ring, unpack the hype around genetically engineered wolves, and take you through the story of five women at MIT who are reshaping the STEM field.

I am incredibly grateful to all the contributors and editors who shared their ideas and made the first year of this publication possible. Special thanks to Ms. Bahr, Ms. Feng, and Sr. Dalo, for their continued support.

As you turn the pages ahead, I hope you feel inspired not just to observe the future unfolding, but to shape it and grapple with our changing reality. As always, stay curious, stay critical, and most importantly—stay ahead of the trend.

Happy reading!

Ciana Tzuo

Ciana Tzuo

EDITORIAL BOARD

FAIR USE NOTICE

TABLE OF **CONTENTS**

Riding the AI & Automation Storm

Jobs, Survival, and the Future of Work

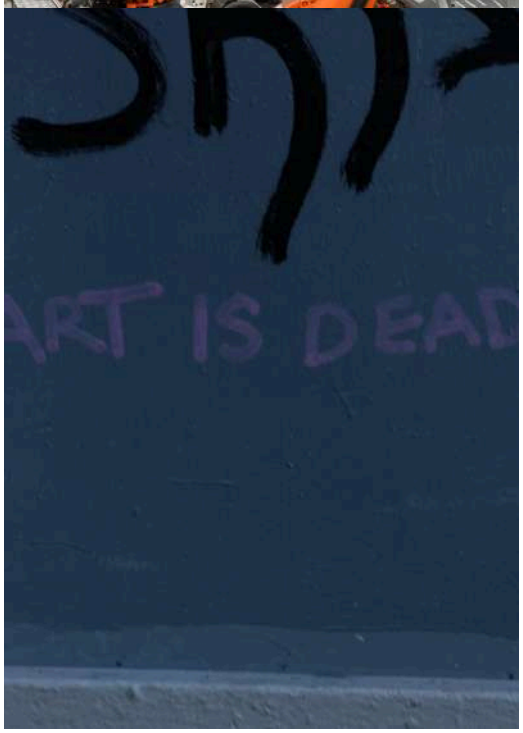
Brighten Sun

You wake up in a world filled with Artificial Intelligence (AI) robots: they have taken many jobs and have substituted many humans. This is the world of many science fiction books, but in the current day, it is starting to become reality. AI and automation are changing the job market: not just in factories, but also in offices, schools, and even creative fields. It's important to understand how AI is going to change the job landscape in the future.

First of all, what are AI and automations? Automation is the use of a computer program to do tasks automatically, generally without human intervention. They are special software programs that go through processes with fixed steps. There are many examples of automation in everyday life, such as kiosks and manufacturing lines in factories. Now, automation is being enhanced by AI, the ability of a computer or program to simulate human intelligence and learn from repetition. AIs are trained to do different tasks such as processing text, making predictions, and analyzing data. AI and automation are already existent in some digital environments, for example in summarizing articles. Now and in the future, there will be AI innovation that can make automation even more effective.

NEW JOBS WILL LEAN ON HUMAN STRENGTHS, AND WILL BE SOMETHING THAT AI CAN NOT DO.

While these tools can increase productivity, there are many jobs that potentially will be affected. Automation by itself has already replaced routine and manual jobs, repetitive work that AI can do more efficiently with less error. But now, as generative AI is able to create text or code that is syntactically correct, it can even replace creative and white collar jobs as well, such as content creation and coding. Drivers and translators can be affected as well. AI automated self-driving cars are a rising technology, and new AI technology can improve the efficiency and correctness in translation. AI can also enhance the business processes, by scaling operations and reducing human error and costs. At the end of the day, artificial intelligence is more reliable than humans, leading to fear of replacement.



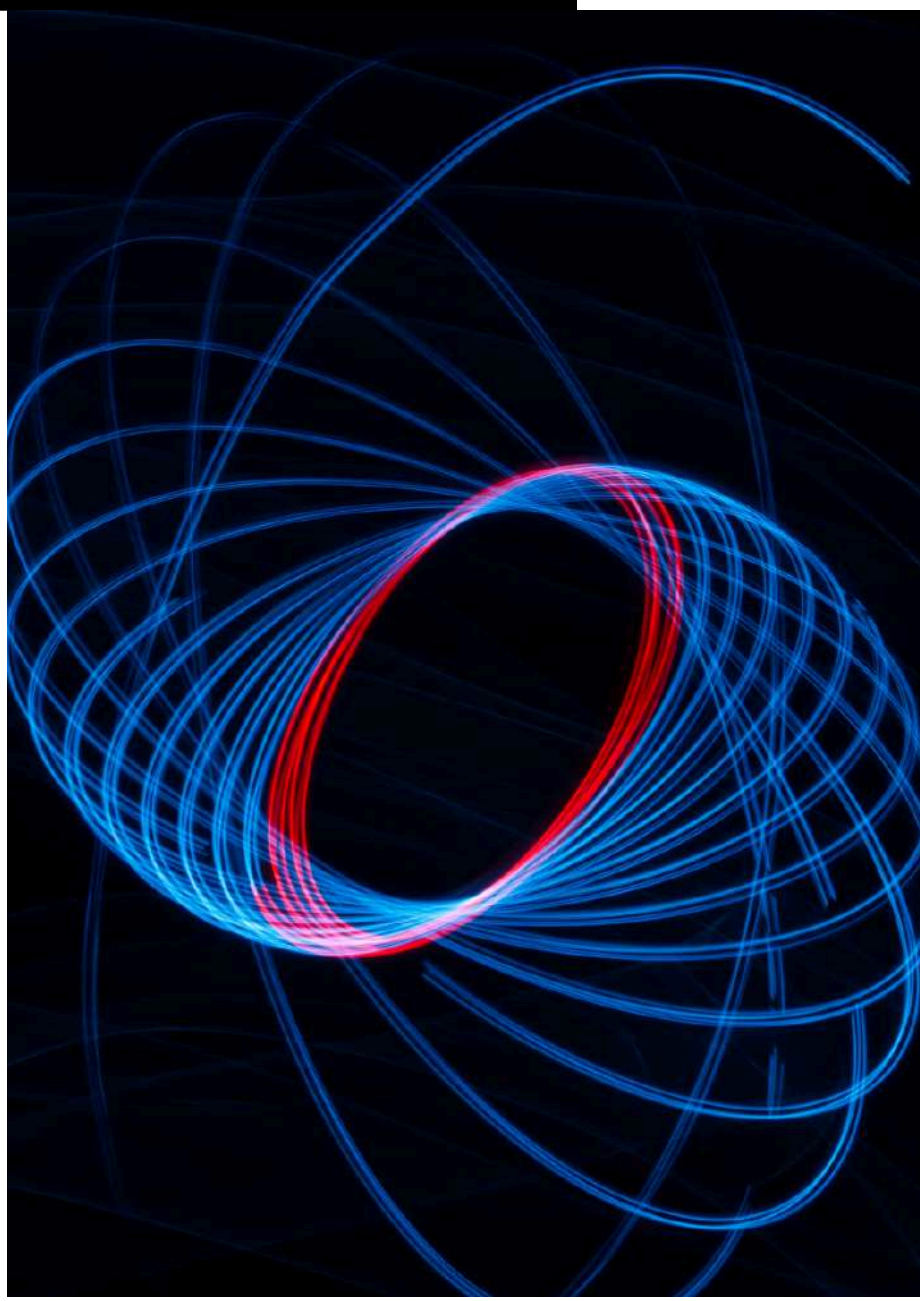
Although there will be a decrease in many jobs, there will also be jobs that will grow in importance. These jobs will lean on human strengths, and will be something that AI can not do. AI development jobs will increase, such as machine learning engineers, natural language processing scientists, data scientists, software engineers, and many more. The other jobs that grow will be those that AI can not replace. There are many creative jobs, such as sculptor, dancer, musician, and athlete, that AI can't reproduce because it is, at the end of the day, only a predictive algorithm that can make decisions based on previous data, meaning that it has no creativity. Business management and law are also hard to replace, because they can't replace human leadership and emotional intelligence. Public service jobs that require interactions such as firefighters, police officers, and doctors will also be hard to replace. AI doesn't have the emotional intelligence that is necessary in many human activities and positions.

AI doesn't have the emotional intelligence that is necessary in many human activities and positions.

AI and automation will completely change the job landscape in the coming years. However, there are important moral considerations to people who are displaced. In May 2023, there were 3,900 job losses in the US due to AI. This leads to serious ethical concerns, since workers displaced by AI can have challenges in terms of income, completely messing up the social structures of life. Another concern relates to the rights and dignity of workers. A way to adapt to the new changes is to re-skill displaced workers to learn new in-demand skills that are relevant to the job market. AI is taking the world by storm, and the way to survive is to let the storm carry you into the future by adapting to AI.

MUTUAL INFLUENCE AND FUTURE DIRECTIONS OF BRIDGING AI AND THEORETICAL PHYSICS

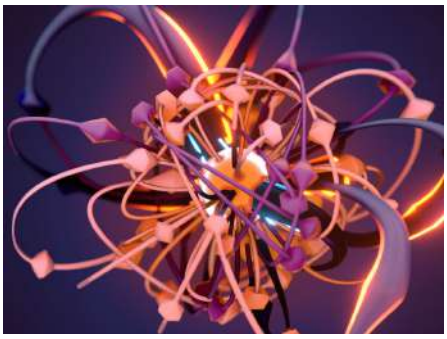
Alexa Foudy



Artificial intelligence (AI) is rapidly transforming the world of physics as its integration is providing scientists with new ways to explore complex problems, simulate physical systems, analyze datasets, and explore theories about the universe. Simultaneously, physics has played a role in developing AI by inspiring algorithms that reflect natural processes. The connection between these two fields is promising for scientific discoveries and technological advancements. By aiming to apply various AI methods to areas of physics, like analyzing complex systems to the fabric of the universe, AI physics seals the gap between AI and the laws governing the natural world.

AI in Physics Research

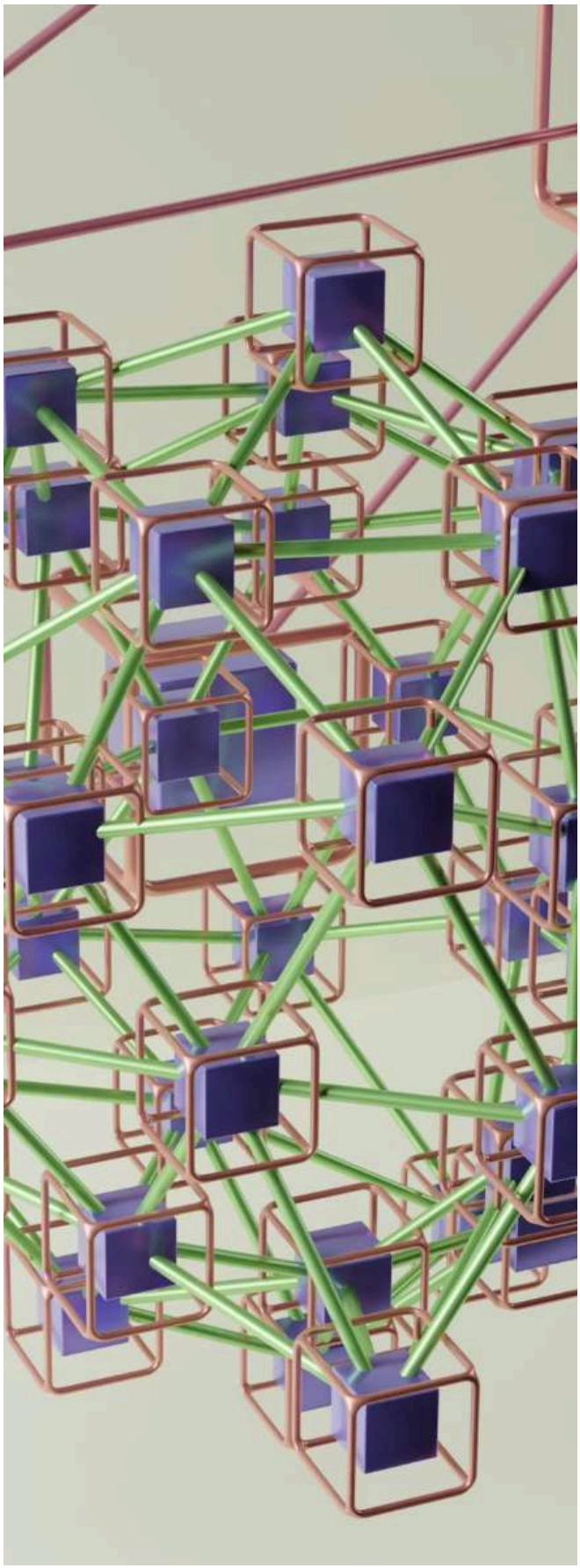
One of the most promising ways AI is impacting physics is through data analysis. In particle physics specifically, researchers collect large amounts of data from experiments such as those collected at the Large Hadron Collider at the Conseil Européen pour la Recherche Nucléaire or European Organization for Nuclear Research (CERN). Machine Learning algorithms aid in examining the data to identify key patterns and rare occurrences that indicate new particles or interactions. Without AI, processing such vast amounts of information would allocate more time and laborious human effort. In addition, AI is transforming computational physics and materials sciences. Scientists use AI-powered simulations to predict the properties of new materials, model atomic phenomena, and optimize designs for new technologies. These simulations help speed up the discovery process and make it easier to study systems that are difficult to observe directly in experiments. Astrophysics is another area where AI is making a difference. With so much data received from telescopes and space exploration, machine learning helps astronomers detect celestial objects, track cosmic events, and refine models of the universe. AI is used to study everything from gravitational waves to the distribution of dark energy, contributing to a deeper understanding of the cosmos.



Physics influencing AI algorithms

While AI is advancing physics, physics is also influencing AI. Many AI algorithms are inspired by natural processes, such as optimization techniques modeled after physics principles. For example, simulated annealing, a method used in AI for solving optimization problems, is based on the way metals cool and harden. Genetic algorithms take inspiration from evolution to improve machine learning models. Furthermore, quantum mechanics is another growing field where physics and AI intersect, where machine learning applies the principles of quantum computing to AI. By using quantum phenomena like superposition and entanglement, quantum AI has the potential to solve problems much faster than classical AI. This could lead to breakthroughs in fields like cryptography, materials science and drug discovery.

Beyond quantum AI, the natural world has been an invaluable source of inspiration. Genetic algorithms and neural architecture, for example, highlight the synergy between AI and physics concepts harnessing the principles that govern the physical universe, such as optimization, entropy and conservation laws, to develop efficient answers to complex problems. Likewise, physics inspired AI algorithms are also present in Swarm intelligence and evolutionary computing. By drawing inspiration from principles and behaviors observed in nature, these algorithms can imitate phenomena like flying birds, swimming fish and crawling ants. Ultimately, the combination of physics and AI not only nourishes our understanding of both fields but also reveals new paths for solving challenges and problems.



The future of AI and physics

As AI continues to evolve, its role in physics is likely to expand, fostering a safer, and more interconnected environment. Scientists are already using AI to explore fundamental theories and questions, such as the nature of dark matter and the inflationary period. AI could also revise physics theories by capturing patterns in datasets that humans might overlook. Simultaneously, understanding the foundations of AI is becoming more important. Researchers are looking at how concepts from physics like thermodynamics and relativity might help explain and improve AI. For example, the way in which AI processes information can be compared to how physical systems manage energy and entropy. The relationship between AI and physics is shaping both fields, making scientific research faster and providing new ideas for improving AI models. This could lead to discoveries that change our understanding of the universe and how we use technology.

OURA RING: A REVIEW

How the Oura Ring Is Redefining Wellness and Shaping Personal Health Tracking

CIANA TZUO

In 2025, health-conscious living has become a large topic of discussion. This discussion has intersected with technology, leading to a rise in wearable devices that help individuals monitor and manage their well-being. The health tech market strived to improve products by making them more sleek, more precise, and a better integration into daily life. The Oura Ring, a lightweight wearable, is an example of all these trends in one product. By condensing its many health-tracking capabilities into a subtle piece of jewelry, it has been top in the field.

The Oura Ring distinguishes itself in both form and function. It has a minimalistic design that ensures comfort and versatility, allowing it to be worn throughout the day from workouts, to formal events. In addition, the device has many innovative technological features. Firstly, it allows sleep tracking. The Oura Ring provides detailed insights into sleep stages, including deep sleep, light sleep, and the overall REM cycle. It provides insights into the quality of a user's rest and generates a score to help users understand their sleep patterns. Secondly, like many other smartwatches, the Oura Ring helps monitor daily activity with personalized daily activity goals and automatic detection of over 40 different activities. The ring tracks your heart rate and performance during these activities. Thirdly, the Oura Ring tracks an assortment of health related metrics, from heart rate, to body temperature, and blood oxygen levels. It has 24/7 heart rate monitoring that tracks heart rate variability, a key indicator to stress and recovery. For body temperature monitoring, the ring measures current skin temperature and the deviation from user baseline, which can indicate changes in

https://ouraring.com/blog/oura-ring-4/

health or recovery needs. The blood oxygen level tracking provides insights into blood oxygen saturation, which is crucial for assessing respiratory health.

These metrics all combine to create a readiness score that indicates how prepared a user is for their day to give advice on lifestyle choices that may affect stress levels. Lastly, the Oura Ring is also particularly effective at tracking menstrual cycles for women by monitoring body temperature fluctuations. These innovative technological features make Oura Ring stand out in its field.

you go to the doctor after you have a heart attack, no one's really going to get all the regular checkups that we should, and wearables can fill that gap.

- oura ex ceo, harpreet rai

So how does such a small device have such a vast amount of capabilities? The Oura Ring leverages many state of the art technologies, such as infrared sensors and sophisticated machine learning algorithms. Infrared light photoplethysmography sensors measure blood volume changes by shining a light through the skin, the data is then used to calculate heart rate and heart rate variability. Infrared LEDs provide insights on respiratory health by measuring blood oxygen levels.

The ring uses negative temperature coefficient (NTC) sensors to measure skin temperature. Also, an accelerometer and gyroscope is used to track motion to provide users with a summary of their daily activity. All this information is processed using machine learning algorithms to learn user behavior and presented to the user in a simple and user friendly application. Independent studies have validated the ring's accuracy in sleep and health monitoring, making it a trusted tool for both personal and professional use.

The versatility, large range of features, and overall accuracy of the ring makes it appealing to a wide range of users. It provides relatively accurate sleep data and when it learns user baseline data, can predict early signs of sickness and provide insightful lifestyle advice. When compared with other technologies, Oura Ring stands out in its sleep tracking abilities and user learning functionality. Despite needing a couple months to collect data, the machine learning aspect of the ring has greatly helped users track their health. Its long battery life and sleek design makes it more attractive than traditional smartwatches like the Apple Watch. While some data may be inaccurate, Oura is responsive to user complaints and strives to improve them in their next iteration of products.

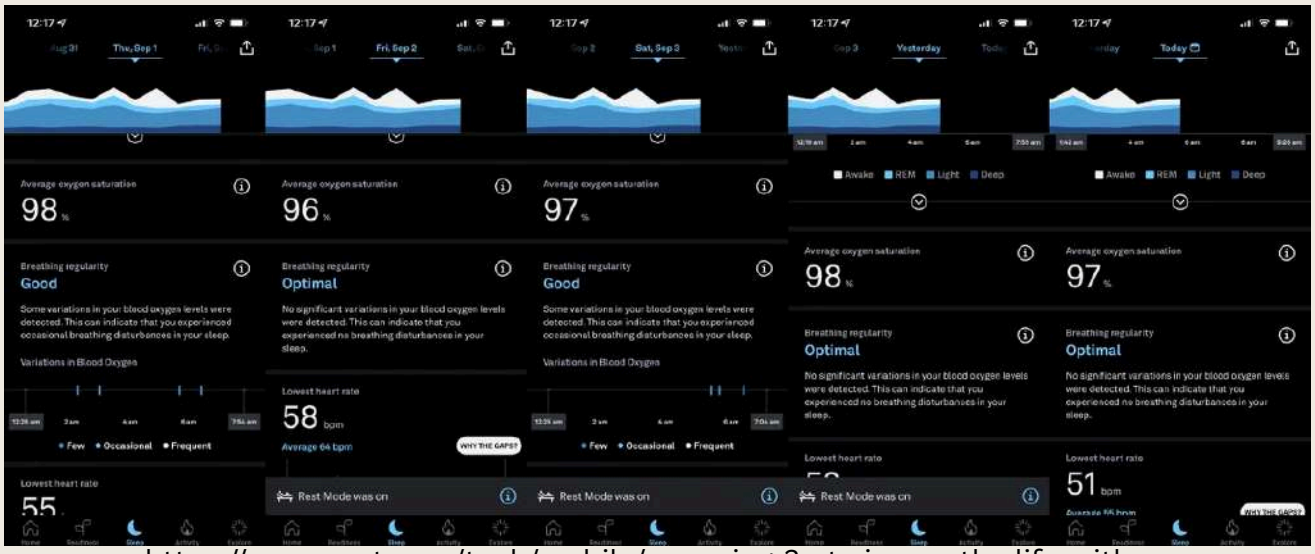
While the Oura Ring has many wonderful features and uses, there are also some downsides. Because the ring collects so much personal health data, users are concerned about the potential usage of their data as shown in other fitness tech companies. (source) Additionally, there have been frustrations over the Oura Ring's slow pace of innovation. Critics have noted that despite being in the market for several years, the ring has yet to have substantial feature updates on main user concerns, such as battery life, and limited fitness tracking features. For instance, the sleep staging system introduced years ago still remains in beta.

https://www.linkedin.com/posts/ginnycheng_upcoming-wearehiring-newjobalert-activity-7199491751550619648-hV1G

Furthermore, Oura Rings are pricey, costing over $300 to purchase with an additional monthly or annual subscription. This has made the Oura Ring less accessible with many feeling like the price is not worth the benefits, especially when feature enhancements are not very frequent. Finally, some users note that health tech culture in general, exacerbated by the Oura Ring, has led people to develop an unhealthy obsession with achieving optimal health metrics, causing more stress rather than promoting well-being. Despite these challenges, many users still appreciate the Oura Ring for its features and simple design.

https://bimedis.com/latest-news/browse/725/smart-rings-next-sensation-personal-health-monitoring

The future of health and fitness technology is rapidly evolving, focusing on increased personalization, integration with other healthcare technologies, and focusing on holistic wellness. Firstly, while 2024 has been a big year for wearable technology, it is projected to continue expanding, as devices are becoming essential for health monitoring. Sensors will most likely improve to better capture and interpret data. Secondly, the integration of Artificial Intelligence (AI) to maximize personalization can revolutionize fitness by tailoring plans for users based on collected data. There have already been signs of this such as Oura Ring's machine learning algorithms to better suit individual users. Lastly, the idea of monitoring overall health rather than



https://www.cnet.com/tech/mobile/oura-ring-3-at-six-months-life-with-a-wearable-that-knows-when-im-sick/

just fitness has been growing. This is reflected in the metrics presented by the Oura Ring, where they not only cover fitness statistics, but also metrics on sleep quality, recovery, and menstrual cycles. Future devices may also be able to integrate with existing health systems, such as smart beds or nutrition apps, to better look at holistic health.

With the rapid expansion of wearables, the Oura Ring's innovation, versatility, and accuracy makes it a leader in health technology. As health tech continues to evolve, the Oura Ring's journey and impact shows how far technology has come and the power of combining technology with human need to track health.

https://techcrunch.com/2015/06/10/a-periodic-table-of-wearable-technology/

GENETICALLY ENGINEERED WOLVES

https://www.npr.org/2025/04/08/nx-s1-5355686/dire-wolf-extinct-colossal-biosciences

Oscar Wang

ADORABLE, BUT NOT QUITE DIRE

The dire wolf is an extinct relative of modern canine species. It lived in the Americas from the Late Pleistocene and Early Holocene epochs (125,000 - 10,000 years ago), ages that are mostly characterized by cold weather and a preponderance of megafauna. They are constituted as part of the last glacial phase of the Last Glacial Period (LGP), or what's more commonly known as the last ice age. Those two attributes of the LGP help explain most of the noteworthy physical differences between the dire wolf and the common grey wolf. The dire wolf's white coat was useful for camouflaging itself in snowy terrain, and its larger body helped it retain heat more effectively. For a pack of dire wolves, each hunt consisted mainly of fighting head-on against one of the Ice Age's behemoth herbivores, similar to the current bison or giant ground sloth. This is why the dire wolf had a much stronger bite force compared to modern wolf species, but had shorter legs relative to its larger body, since its prey wasn't likely to run away. The dire wolf went extinct alongside many other species that we now consider to be staples of the last Ice Age (e.g. mammoths, sabertooth tigers, giant beavers, etc.) as the Earth exited the LGP and into a much warmer interglacial period, where glaciers receded closer toward the poles. Climatic change and decline in megafauna helped to accelerate the decline of dire wolves such that we don't see any more large, white wolves walking around today.

In early April, Colossal Bioscience, a biotech company that specializes in genome editing, did something interesting:they claimed that they had ostensibly revived the species with the birth of three dire wolf pups. The

company had previously been most well known for creating the “woolly mouse”, which was a mouse whose genes were edited to express brown, shaggy fur, similar to the woolly mammoth. It was very cute, but small scale. In the case of the dire wolves, they used fossils of these wolves to extract and analyse their genomic data. Given that gray wolves and dire wolves share 99.5% of their DNA, researchers at Colossal Bioscience used the genome of the gray wolf as a foundation (like a frozen pizza), and edited 20 sites on 14 genes (like switching salami for sausage on your frozen pizza) to make the gray wolf express more dire wolf-like characteristics.

https://www.theguardian.com/science/2025/mar/04/genetically-modified-woolly-mice-mammoth

Separate from the initial media hype, researchers concede that their creations aren’t truly dire wolves: many more edits need to be made before they could reach a genetically identical version of the long-extinct dire wolf. However, they claim that their goal is to produce something that is functionally similar rather than genetically identical. With this frame of mind, they were rather successful. Scientists unaffiliated with Colossal Bioscience have criticised the company’s project for being frivolous, especially since dire wolves don’t have a place in Earth’s current ecosystems. There are existing large populations of predators that play a similar role as the dire wolf in their ecosystems. There is more widespread agreement, however, that Colossal’s innovations have potential for conservation efforts for species such as the endangered red wolf. With a limited population comes a limited gene pool, and gene editing could make a significant difference in the genetic diversity in red wolf populations, thus increasing their survivability. In addition, the red wolf’s genome is more readily available. By switching their focus from bringing back millenia-old species whose epochs have long since passed, to helping to protect important contemporary species from becoming extinct in the first place, Colossal Bioscience could carve out a meaningful and innovative role in modern conservation. They won’t just create headlines, but ensure that animals like the red wolf don’t disappear for good.

Beyond the Lab

WOMEN AT MIT AND THE FUTURE OF STEM

Ciana Tzuo

The Science, Technology, Engineering, and Mathematics (STEM) fields have historically been a male dominated field, but in recent years, more women have joined the workforce. In 2023, there were around 30% of women in the STEM workforce. This number is still relatively low from an even split, but a new generation of women is proving that the landscape is still changing and developing.

I had the opportunity to interview five inspiring women, Jessy Han, Katarina Cheng, Emily Gan, Jia Wan, and Mansi Sood, who are pursuing degrees and careers in STEM at Massachusetts Institute of Technology (MIT). Their stories and background offer a glimpse into the challenges, triumphs, and the overall journey of being a woman in the STEM field, highlighting the importance of interdisciplinary study, self-driven learning, and representation in male-dominated fields.

For many, the path into STEM was anything but straightforward. Katarina Cheng came to MIT drawn by her love of math but eventually pivoted to computer science. “"I took a cryptography class my sophomore year almost on a whim, and I completely fell in love with it," she said. Today, she's deep into cryptographic security research and even is a teacher assistant (TA) for the very course she once found intimidating.

Jessy Han also began her journey with a broader interest in Computer Science (CS), but it was a software engineering internship during college that clarified her path. She realized she didn’t enjoy her experience working purely with software at a company as much as she hoped and applied for grad school to get

involved in more research. “I wanted a more interdisciplinary approach to computer science and be able to apply it to more real world applications,” she said. This motivation led her to do research at MIT as a PhD student, where she connected her interest in computer science and political sciences, applying machine learning and causal inference to criminal justice and healthcare outcomes.

Similarly, Emily Gan started in MIT as an undergrad in bioengineering before transferring to CS. For her, she felt that CS has faster paced problems and that she could make more of an impact in the field. Her main research interests are in statistics and inference problems.

Jia Wan, a second year-PhD student in EECS, emphasized how her background shaped her approach to STEM. Coming from a rural town in China, Jia navigated the U.S. college system with remarkable independence, self-studying for the SATs and eventually enrolling at Columbia University for her undergraduate, where the mandatory humanities curriculum deeply influenced her thinking. “It helped me learn how to write and speak thoughtfully,” she said. Though she pursued math and later CS, the experience of having to read and discuss 15 books per semester stayed with her. The humanities background now plays a role in her highly mathematical research in reinforcement learning and casual inference, where she collaborated with political scientists and legal scholars to explore algorithmic fairness.

Across their stories, they all have one thing in common: these women all wanted to make something real and be able to apply their passion for STEM into real situations.

The road to pursue STEM hasn’t always been easy for these women. Cheng recalls feeling terrified by the open ended-ness of research and discouraged by the constant failure. “The research problem statements were usually very open and just consisted of trying to make existing protocols in literature more efficient,” she said.

Similarly, Han felt that PhD research pushed her to take responsibility in considering her passions. “You’re in charge of your research so you have the freedom and responsibility to propose a question and convince your research advisor that it is a good idea,” she said. Han states at the beginning, she never really knows where the project will go and develops a specific question and thesis later on in the process after experimenting and reading current literature, she said.

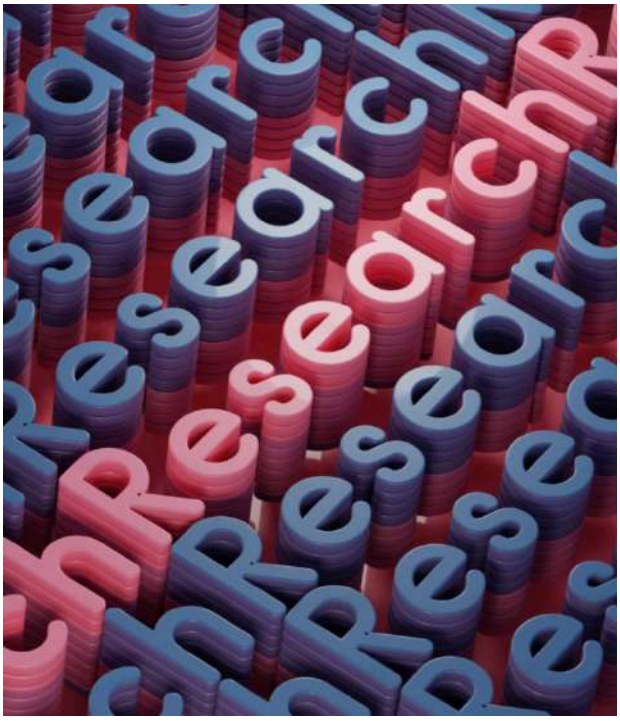
In the early stages of working in research, Cheng did feel amounts of imposter syndrome. “I was working with people who had so much more experience and knowledge than me,” she said, “Keeping up was definitely a big challenge, because I felt like I couldn’t contribute anything.”

Looking back, Cheng highlights that she found it surprising how much she enjoyed working with other people. As a math or computer science major, she usually worked alone, but she found that there were many benefits in collaborating with people who think differently. “It was challenging to get used to working with people who have a different pace or rhythm than you, but it was great to have different angles, backgrounds, and ideas to pull from, especially with how broad the research usually is,” she said.

Because of Han’s diverse, interdisciplinary background, she felt like her biggest challenge during research was being able to communicate and consider all sides of a problem, she said. “Because I do heavily interdisciplinary research, I need to collaborate with people from different backgrounds,” she said, “You really need to speak their language in the sense that they can understand the other field while giving their own input.” Han found it challenging sometimes to explain concepts that may seem implicit to her but unfamiliar to people outside of the field.

Wan echoes this sentiment. While her research before was largely theoretical, it always begins from a practical question. “I used to work more on theoretical mathematics, but as I got to interact with people from other fields and be exposed to more courses both STEM and non-STEM, I felt inspired to apply my work to what’s happening in society,” she said.

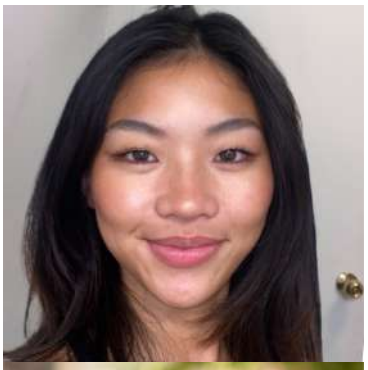
Mentorship and community have also played major roles in shaping these women’s experiences and guiding their development in the STEM field. Mansi Sood, with a unique international background, felt lucky to have a supportive lab and environment that mitigated the bigger challenges of adjusting to a new system of life and research, she said. “The biggest challenge for me was mainly being in a new environment and the increase in the amount of freedom.”



During Sood’s work on her PhD at Carnegie Mellon University (CMU), she felt that it was important to find a mentor that, besides being excited about their work, was supportive and able to guide her through the research process. In the end, she collaborated with a female researcher who was very supportive and made a big impact in helping her through the PhD process.

Many of the women also hoped to help other women in the STEM field. In Han’s case, she felt that there wasn't a huge support system for women in the STEM field, leading her to create her own platform that focuses on creating a support group for women in STEM fields.

Emily Gan



Katarina Cheng

Jessy Han

Jia Wan

Mansi Sood

"Discrimination in the [STEM] field isn't always obvious, it is more a feeling of alienation, especially when all the male students are discussing among themselves," she said, "I hope to help women learn to be more confident and speak up when they should in conversations."

Furthermore, Cheng, who has taught multiple semesters as TA shared, ""The TAs often make or break the class. I try to be the kind of mentor I wish I had, someone who encourages you to ask questions and makes you feel like you belong."

As each of these women continue to carve their own path in the world of STEM, their journeys remain uniquely personal but also interconnected. What emerges across their stories isn't just a common love for science or math, but a persistent drive to bridge the technical with the human. "I think STEM and the humanities can deeply inform each other," said Wan. "We need good theory to make tools better, but we also need to understand people, context, and the world the tools are shaping." These women are not only solving technical problems, they are reshaping the conversations in STEM and reminding us that science is not static, and neither is who gets to do it.

Advice!

1. Explore before committing to a path.
2. Be curious and interdisciplinary.
3. Switch if something feels right
4. Follow what excites you, not just what looks impressive.
5. Let go of perfection.

MIDWAY TECH TRENDS 2025

AI Development:
More Personal, More Practical, More Powerful

AI in 2025 has shifted from generation to action and automation. It is being more integrated into everyday use. Models are becoming faster, more multimodal, and increasingly personalized. AI is getting embedded into many core softwares and devices.

GPT-5.5 and Claude 3.5

have been released with better memory, better logic, and improved multimodal capabilities, for example processing video, audio, and text with higher context awareness

OpenAI's Sora

rolled out public testing, producing realistic clips from text prompts

Apple Intelligence

launched with system-wide smart features built into iOS and macOS.

> **"It's not about displacing humans, it's about humanizing the digital experience.**

Rob Garf,
Vice president & General manager,
Salesforce Retail

MIDWAY TECH TRENDS 2025

Consumer Tech: Small and More Seamlessly Embedded

Consumer technology has focused on intelligence without intrusion into daily life. Devices have become more subtle and AI-powered.

- Samsung Galaxy Z Fusion is the first smartphone/tablet hybrid with AI-powered UI that reshaped the screen layout based on user behavior.
- Smart Earbuds (from Sony and JBL) that incorporate real-time language translation and AI audio tuning based on environment and user habits.
- Rabbit R1 is a new AI device built around natural language interface and routines, meant to replace apps by doing tasks for you

> **"The reality is that being unprepared is a choice. The benefits come when we see AI as a tool, not a terror, and bring it into our sales motions."**

Anita Nielsen
President, LDK Advisory Services

Quantum Computing and Neuromorphic: Computing That Thinks and Solves

There has been a breakthrough in neuromorphic chips and hardware that mimic the human brain's neural architecture, allowing for parallel, energy-efficient data processing.

- Microsoft's new Majorana 1 Chip is the first to feature eight topological qubits, which offer better stability, scalability, and error resistance than other qubit designs.
- PsiQuantum's Pega (Omega) chip is a photonic quantum computing chip designed for scalability and easy manufacturing of quantum computers.
- Neuromorphic chips research and development allow for more energy efficient and easily scalable systems that can leverage edge AI and machine learning.

MIDWAY TECH TRENDS 2025

Sustainable Tech and Energy Innovation: Clean Energy in an AI world

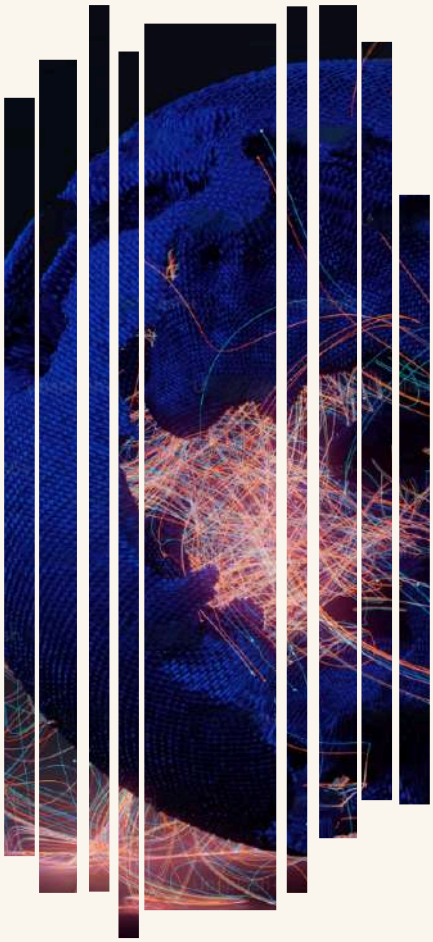
The energy demands of AI and data centers are accelerating investments in nuclear power and sustainable tech.

- Google and Alphabet Inc. partnered with Kairos Power to fund the construction of seven small modular reactors (SMRs) which are expected to generate 500 megawatts of power across six or seven locations.
- Climeworks captures CO2 from the air, concentrates it, and stores it permanently underground.

Neurotech and Human-Machine Interfaces: Direct Brain-Computer Connections

Brain-Computer interfaces (BCIs) and neurological enhancement technologies are making headlines, with startups like Neuralink advancing implantable devices.

- Neuralink and Synchron Human Trials have early patients use brain-computer interfaces (BCIs) to control cursors, communicate, and move prosthetics, showing BCI's first practical applications
- Woebot Health AI Therapy updated its CBT chatbot with multimodal sensing for more empathetic and target responses
- Products like Muse S Gen 3 and MindLax now combine brainwave tracking and haptic feedback to guide anxiety management



MIDWAY TECH TRENDS 2025

Ethics and Regulation: Accountability and Regulation in Developing Technology

The large surge in technological innovation in the past year has also brought new ethical dilemmas and regulatory scrutiny. Questions around privacy, bias, and accountability, and security are no longer theoretical and demand urgent, practical solutions.

- The European Union's (EU) Artificial Intelligence Act is the world's first comprehensive legal framework for AI. It classifies AI systems by risk level, imposing strict requirements on high-risk applications (such as those in infrastructure, employment, and law enforcement) and banning systems deemed to pose "unacceptable risk" (social scoring, real-time biometric surveillance)
- While the US has yet to adopt a comprehensive AI law, 2025 has seen increased legislative and regulatory activity with a focus on AI accountability, data privacy, and cybersecurity.

Robotics and Automation: Robots Leave the Factory

Robots can now leave controlled environments thanks to advances in AI, sensors, and materials. Polyfunctional robots now perform multiple tasks in logistics, healthcare, and public spaces.

- Agility Robotics's Digit have created robots with human-like mobility for logistics and delivery (7 hour long video of humanoid robots working)
- Polyfunctional robots deployed in warehouses, hospitals, and urban settings

The first half of 2025 marks pivotal moments in technology's evolution in many fields. Breakthroughs in AI, quantum computing, and robots are redefining society at large, but with these advanced come new responsibilities.

Regulatory frameworks need to be developed to ensure there is a balance between innovation and transparency and accountability. As technology continues to develop, the challenge will be to ensure that progress is guided by principles that protect individuals.

REFERENCES

Riding the AI and Automation Storm: Jobs, Survival, and the Future of Work

"What is AI automation? Your guide for 2025." Make. Last modified January 22, 2025. Accessed May 18, 2025. https://www.make.com/en/blog/what-is-ai-automation.

Lutkevich, Ben. "Will AI replace jobs? 18 job types that might be affected." TechTarget. Last modified April 30, 2025. Accessed May 18, 2025. https://www.techtarget.com/whatis/feature/Will-AI-replace-jobs-9-job-types-that-might-be-affected.

Girimonte, Melissa. "Jobs That Are Growing With the Rise of AI." PartnerStack. Accessed May 18, 2025. https://partnerstack.com/articles/ai-job-growth.

Gertenbach, Emily. "120 Jobs That AI Won't Replace." Upwork. Last modified November 27, 2024. Accessed May 18, 2025. https://www.upwork.com/resources/jobs-ai-wont-replace.

Chaney, Paul. "Are Human Jobs Lost to AI an Ethical Issue?" Marketing Ethics Digest (blog), February 21, 2024. Accessed May 18, 2025. https://aimarketingethics.substack.com/p/are-human-jobs-lost-to-ai-an-ethical.

Mutual Influence and Future Directions of Bridging AI and Theoretical Physics

VanLee, Garrett. "AI Physics Connects Technology and Theoretical Physics." Rescale. Last modified September 14, 2023. Accessed May 18, 2025. https://rescale.com/blog/ai-physics/.

Lea, Robert. "Dark energy remains a mystery. Maybe AI can help crack the code." Space.com. Last modified March 8, 2024. Accessed May 18, 2025. https://www.space.com/ai-dark-energy-precision-universe-simulation.

Spears, William, and Diana Spears. "Physicomimetics: Physics-Based Swarm Intelligence." ResearchGate. Last modified January 2012. Accessed May 18, 2025. https://www.researchgate.net/publication/228073045_Physicomimetics_Physics-Based_Swarm_Intelligence.

Kneiding, Hannes, and David Balcells. "Augmenting genetic algorithms with machine learning for inverse molecular design." Chemical Science, September 11, 2024. Accessed May 18, 2025. https://doi.org/10.1039/d4sc02934h.

Oliva, Diego, Mohamed Abd Elaziz, Ammar H. Elsheikh, and Ahmed A. Ewees. "A review on meta-heuristics methods for estimating parameters of solar cells." ScienceDirect. Last modified August 23, 2019. Accessed May 18, 2025. https://www.sciencedirect.com/science/article/abs/pii/S0378775319306548.

How the Oura Ring Is Redefining Wellness and Shaping Personal Health Tracking

Ferrante, Carleigh. "I've Worn The Oura Ring For Almost 2 Years: 7 Reasons I Love It (& What I'd Change)." mindbodygreen. Last modified September 3, 2024. Accessed May 18, 2025. https://www.mindbodygreen.com/articles/oura-ring-review?srsltid=AfmBOoq34Xznv4Ib7Jx-_yXxUijOyLgWCEfeD5Z_9p_T8Twy8n1VCbSn

Butler, Eliza. "Your Somatic Therapist Wants You to Stop Wearing Your Oura Ring." All Parts. Last modified June 2, 2024. Accessed May 18, 2025. https://elizabutler.substack.com/p/your-somatic-therapist-wants-you.

REFERENCES

Gondhia, Nirave. "I love the Oura Ring 4, except for one big thing." DigitalTrends. Last modified November 15, 2024. Accessed May 18, 2025. https://www.digitaltrends.com/mobile/i-love-the-oura-ring-4-except-for-one-big-thing/#dt-heading-a-mostly-great-experience-with-one-drawback.

Boxall, Andy. "I wore an Oura Ring for all of 2024. Here's why I love it and why I'm concerned." DigitalTrends. Last modified December 20, 2024. Accessed May 18, 2025. https://www.digitaltrends.com/mobile/one-year-with-an-oura-ring-why-i-love-it-and-why-im-concerned/#dt-heading-how-much-have-i-worn-the-oura-ring.

Chen, Brian X. "This Ring on Your Finger Tracks Your Sleep. Is It Worth the Splurge?" New York Times. Last modified October 18, 2024. Accessed May 18, 2025. https://www.nytimes.com/2024/10/17/technology/personaltech/oura-ring-sleep-tracker.html#commentsContainer.

Svensson, Thomas, Kaushalya Madhawa, Hoang NT, Ung-il Chung, and Akiko Kishi Svensson. "Validity and reliability of the Oura Ring Generation 3 (Gen3) with Oura sleep staging algorithm 2.0 (OSSA 2.0) when compared to multi-night ambulatory polysomnography: A validation study of 96 participants and 421,045 epochs." Sleep Medicine 115 (March 2024). Accessed May 18, 2025. https://doi.org/10.1016/j.sleep.2024.01.020.

"Oura Ring 4." Oura. Accessed May 18, 2025. https://ouraring.com/product/rings/oura-gen3?g_acctid=404-975-2641&g_adgroupid=&g_adid=&g_adtype=none&g_campaign=pmax_prospecting_integrated_USA_purchase_english_mh&g_campaignid=20915188257&g_keyword=&g_keywordid=&g_network=x&utm_campaign=OUR_SEM_Summer_Q4FY24_US_GoogleAds_PMAX_Various_XDV_Digital_CPC_Various_1x1_07-01-2024_09-30-2024_Placement&utm_content=Summer_Q4FY24&utm_id=&utm_medium=cpc&utm_source=google&utm_term=&gad_source=1&gad_campaignid=20915193264&gbraid=0AAAAAqpUsIkQ6uytJXo1qAZvJmxBOWDCC&gclid=EAIaIQobChMI_sXao5asjQMVWV9HAR0Dzi5YEAAYASABEgIlzfD_BwE&gclsrc=aw.ds.

Genetically Engineered Wolves: Adorable, But Not Quite Dire

Kluger, Jeffrey. "The Return of the Dire Wolf." Time. Last modified April 7, 2025. Accessed May 18, 2025. https://time.com/7274542/colossal-dire-wolf/.

Nuwer, Rachel. "Dire wolves and woolly mammoths: Why scientists are worried about de-extinction." BBC. Last modified April 25, 2025. Accessed May 18, 2025. https://www.bbc.com/future/article/20250425-why-scientists-fear-attempts-to-resurrect-extinct-animals-may-backfire.

"Dire Wolf." Colossal. Accessed May 18, 2025. https://colossal.com/direwolf/.

Sulmasy, Daniel, and Peter Marra. "Scientists Claim They Genetically Engineered a Dire Wolf. Should We Bring Back Extinct Species?" Georgetown University. Last modified April 11, 2025. Accessed May 18, 2025. https://www.georgetown.edu/news/ask-a-professor-dire-wolf/.

REFERENCES

Callaway, Ewen. "Meet the 'woolly mouse': why scientists doubt it's a big step towards recreating mammoths." Nature. Last modified March 4, 2025. Accessed May 18, 2025. https://www.nature.com/articles/d41586-025-00684-1.

2025 Mid-Way Tech Trends

Alvarez, Gene. "Gartner Top 10 Strategic Technology Trends for 2025." Gartner. Last modified October 21, 2024. Accessed May 18, 2025. https://www.gartner.com/en/articles/top-technology-trends-2025.

Carlson, Jeff. "CES 2025: We Still See These 35 Products When We Close Our Eyes." CNET. Last modified January 16, 2025. Accessed May 18, 2025. https://www.cnet.com/pictures/ces-2025-we-still-see-these-35-products-when-we-close-our-eyes/.

Shkvarun, Ivan. "Top 10 Technology Trends For 2025." Forbes. Last modified February 3, 2025. Accessed May 18, 2025. https://www.forbes.com/councils/forbestechcouncil/2025/02/03/top-10-technology-trends-for-2025/.

Webb, Amy, Melanie Subin, Victoria Chaitoff, Nick Barlett, Sam Jordan, Mark Bryan, Sam Guzik, Marc Palatucci, Andrew McDermott, and Andrew Hornstra."2025 Tech Trend Report." Future Today Strategy Group, 2025. Accessed May 18, 2025. https://ftsg.com/wp-content/uploads/2025/03/FTSG_2025_TR_FINAL_LINKED.pdf.

"What the EU AI Act Means for Your Data Strategy in 2025." Alation. Last modified May 13, 2025. Accessed May 18, 2025. https://www.alation.com/blog/eu-ai-act-2025-data-strategy/.