predictive quarter report

2025

Reporting Period
Jan - Apr

Prepared by
Red Thread X

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Executive Summary

The Predictive Quarter of 2025 clearly exposed exponential advancements in technology that promise to solve some of the world's most pressing problems and, in the wrong hands, have the possibility to create catastrophic outcomes.

This report explores the accelerating convergence of technology and humanity, presenting a critical choice to all of us: the imperative to consciously 'Be Better.' Like a plum conjoining with an Apricot facing the potential to become a pluot—a hybrid potentially superior and quite possibly far more delicious than its individuated predecessors—humanity must now decide how to integrate AI, Biotechnology, and other advancements with civilization.

The purpose of this Red Thread X quarterly report (and all future reports) is to apply lateral insights from the current zeitgeist that help us better understand the direction of travel in real time of technology, policy, and society so that we can better see where the future of science, business, decision-making and investment is going that we may all make the best decisions possible in our daily roles in business, government, academia and society.

Our topics will never overstate the glaringly obvious, for example there is no specific mention of AI (as AI is already the ingredient layer in everything so is noted everywhere) and are meant to provoke the curiosity effect to beg the questions of 'so what?' and 'What's Next?'

So as we ponder how we might use these insights to 'Be Better', we ask: will we guide this fusion of technology and humanity towards elevating human potential and dignity, achieving a 'Better' state, or will our decades long rush of headlong tech optimism and ensuing apathy to its foregone conclusions dictate an outcome we didn't choose? This summary outlines the key forces shaping this choice, derived from the report's analysis.

The Moon: No Longer Far Away
The Moon is rapidly evolving from a distant object to critical infrastructure, becoming Earth's off-planet hard drive and logistics hub and launching pad to other planets and the possibility of our becoming and an interstellar species. As private companies build a cislunar economy with both AI-powered systems and Nuclear-powered reactors, the need for deliberate governance, updated legal frameworks (beyond the 1967/1979 treaties), and interplanetary cybersecurity becomes urgent to manage this new frontier wisely and avoid a "Wild West" scenario.

Welcome Back to the Mirror World: The Rise of Embodied AI
AI is no longer confined to screens; it's entering the physical world as Embodied AI and the "AI of Things," learning and acting autonomously. This shift demands we learn to "swim" in this new reality, complementing AI rather than competing with it. The imperative is to use this power to enhance human capabilities ethically, adapting skills ("surge skilling"), and ensuring AI actions align with human values, rather than simply replacing human agency.

Beyond Embodied AI lies Living Intelligence—a networked ecosystem merging AI, Biotechnology, and sensing into adaptive systems embedded in digital and biological realms. LI challenges our concepts of autonomy, consent, and the human-machine interface (e.g., neural implants, programmable cells). We must define what a superior integration looks like, establishing frameworks to govern systems that don't just process the world but participate in it, potentially reprogramming biology itself.

Synthetic Everything (Biology, Data, Humans)
The convergence of AI, massive compute power, and synthetic biology grants unprecedented ability to engineer biological systems—from microbes that degrade plastic to DNA data storage and potential de-extinction. As Ben Lamm warns, this intersection is potentially powerful and dangerous. Ensuring desirable outcomes requires careful stewardship, robust ethical frameworks, and mitigating unintended consequences as we manipulate the very building blocks of life.

Biohacking | Don't Die. Ever.
The quest is shifting from merely extending lifespan to enhancing healthspan—the duration of a healthy, active lifespan and extending into the escape velocity of potential immortality. While biotechnology offers tools for regeneration and longevity, the goal must be not simply a longer life, but an improved one. This requires addressing crucial questions of access, equity, healthcare economics, and preserving the social and emotional connections vital for well-being, ensuring biohacking serves humanity rather than creating new divides.

The Chemical of the Year: Testosterone
As we highlight the declining engagement of young men in society (education, work, relationships), this trend exposes a critical societal challenge exacerbating shifts in the fabric of society itself as the effects of technology and social media are seen on the first generation that was born digital. The implications on everything from the family to society to the rise of nationalism and global order can not be underestimated. Addressing this requires more than technological solutions; it demands leveraging technology constructively to create real support systems, foster positive connections, modernize mentorship, and provide pathways for meaningful participation in the modern economy and society.

Prepared by:
RTX Data & Writing Team

Convergence to Be Better
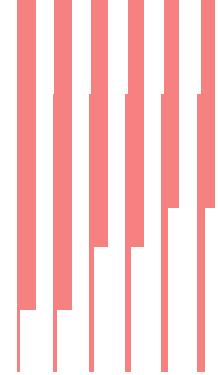
Humanity's Choice to 'Be Better'

We are, daily, living through a Convergence—a radical fusion of technologies reshaping existence. This convergence presents immense potential but also profound risks like lost agency and eroded trust. The boundaries between human and machine, biology and code, are collapsing. Like the plum needing conscious cultivation to become the superior pluot, humanity must actively choose to lead with intention and centered ethics, and build with foresight.

Convergence is not destiny; it is a decision.

The future hinges on our commitment, now, to strive for a genuinely 'better' integration of technology and humanity.
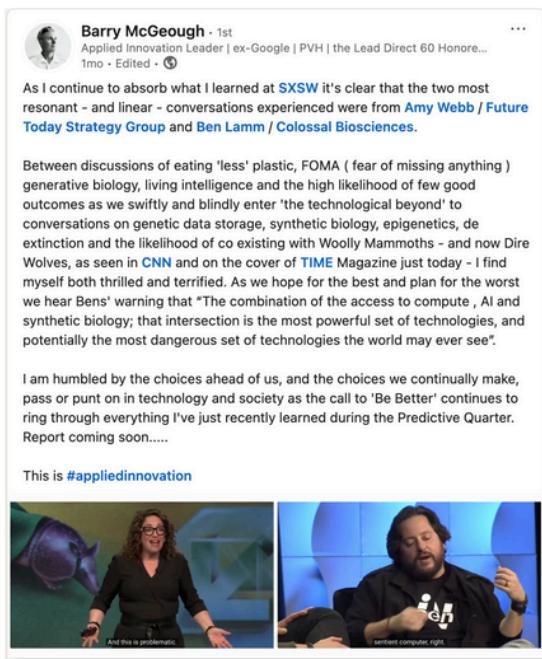
Introduction:
Pluot Report

This report explores the accelerating convergence of technology and humanity, viewing it through the lens of a fundamental choice: the imperative to 'Be Better'. Like a plum facing the potential to become a pluot, a hybrid potentially superior to its origins, humanity must now decide how it will integrate AI, Biotechnology, and other advancements. Will we consciously guide this fusion towards elevating human potential and dignity, or allow inertia to dictate the outcome? The report analyzes the key forces shaping this choice, specifically using Red Threads - synthesized insights derived from diverse interactions, sources, and timelines - to provide actionable intelligence for strategic decision-making, aiming to help us navigate this pivotal moment and consciously strive for the 'Better' path.

Red Threads are insights & connections from diverse interactions, sources, & timelines: Consumer Electronics Show, National Retail Federation, World Economic Forum, South by Southwest, and others. Red Thread X gathers & analyzes this information to provide actionable intelligence for strategic decision-making.

The Predictive Quarter's Red Threads (as part of our quarterly reporting series: The Predictive Quarter, The Proactive Quarter, The Prevailing Quarter, and The Perspective Quarter) point to a future in which the radical shifts of technology are converging with humanity and thus our choices about the future. Some of these choices we can make, some we should make, and some are being made for us. The analysis highlights key emerging trends at this intersection, with Red Thread X presenting critical insights to identify actionable opportunities and potential risks for individuals, organizations, and decision-makers seeking not just to adapt but to actively shape a better future.

The Red Thread X assessment indicates a significant acceleration of the known technological convergence in 2025. This is driven by radical acceleration in the performative capabilities of Artificial Intelligence, Sensors and the Internet of Things, and Biotechnology and their confluence, as cislunar competition emerges (cislunar refers to the space between the Earth and the Moon). Concurrently, we are experiencing major changes in the social fabric, physical and mental well-being, and agency of human existence.

This convergence presents a transformative landscape, demanding strategic foresight and proactive engagement —a call to actively participate in our collective evolution.

The Red Threads for 2025 presented here provide a framework for understanding these interconnected forces, from the development of a lunar economy to the increasing integration of embodied AI and advances in biotechnology and ubiquitous sensing and processing of the volumes of data we generate every day.

This report outlines the critical choices and strategic imperatives necessary to responsibly navigate this evolving environment, capitalize on emerging opportunities, and consciously pursue improvement.

Introduction:
(continued)
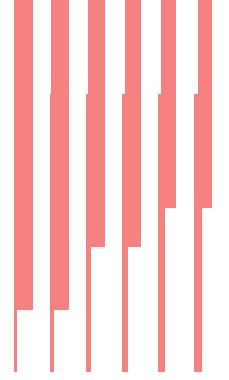
2024 saw the world enter the start of a technology supercycle. Within the framework of Kondratieff waves (long economic cycles), a supercycle represents the decades-long expansionary phase fueled by major technological innovation. Most supercycles typically begin with a single innovative technology, such as the industrial revolution following the combustion engine. This current supercycle, which is ongoing, began with three separate and interwoven technologies, each being a force in and of itself:

- AI: it will become second nature, similar to electricity, with no cognitive awareness of its presence.
- Connectedness: the Internet of Things on steroids, and it has become what we deem the "AI of Things" (AIoT) where AI meets the physical world (Physical AI).
- Biotechnology: Materials Science and Generative Biology allow for the production of products, medicines, and even organisms previously infeasible and inconceivable.

Additionally, 2024 provided key insights into major themes that emerged in 2025. The need for advanced chipsets is growing. Increasing server farms are becoming more common. Quantum computing, potentially leveraging advancements such as Intel's silicon qubit processors is being explored for cryptocurrency applications. Furthermore, advanced cybersecurity measures are essential, as the proliferation of AI is undeniable. All of these factors place extraordinary demand on our power generation and distribution capabilities, revitalizing the need for nuclear power. This includes strategies like securing power from existing reactors (evidenced by major tech firms like Microsoft exploring large-scale nuclear power purchase agreements and hiring nuclear experts to ensure stable energy for data centers, while Google also pursues clean energy contracts), deploying small modular reactors (SMRs), and pursuing advances in small tokamak nuclear fusion like the recent record-breaking 'artificial sun' breakthrough lasting 1,066 seconds.

As technology advanced on Earth from 2024 to 2025, innovation and capital shifted from Earth's surface to space as well. A new space race emerged, with commercial companies dominating the market and media. Payload launches and deployment for lunar operations captured the imagination and the breadth and pace of commercial space technology evolution. The Moon has become a competitive environment between nations and industry for access and control of space-based resources. The role and accessibility of cislunar space positions the Moon center stage for near-term opportunities and long-term competition, challenging us to establish better, more sustainable frameworks for off-world expansion.

While technology offers boundless opportunities, the human condition is at peril. The crisis of loneliness and depression persists. Technology applied to society can drive wedges in the human experience. Prevalent technologies like AI companions and ubiquitous social media could supplement human connection or supplant it – a critical choice point in our quest to use tech to be more connected, not more isolated. Advances in Biotechnology, such as longevity research, synthetic biology, gene editing, and psychedelics, offer prospects for a longer lifespan. However, their impact on healthspan – the duration of our physical, mental, and social well-being that allows for active participation in life – remains questionable, demanding we focus on better lives, not just longer lives.

Lenin is credited with saying, "There are decades where nothing happens; and there are weeks where decades happen" - a phrase that Amy Webb revisited in her SXSW 2025 keynote session. We are in the latter period, and the amazing and rapid evolution of technology is offset by an alarming lack of control, regulation, or governance of the major contributors to this technology supercycle. To paraphrase Geddy Lee, if we choose not to decide, we still have made a choice. The micro decisions and non-decisions we make daily (did you really read that user agreement?), from the individual to organizational or governmental levels, are adding up quickly. Added to a marketplace of free data exchange and utilization, potential risk increases exponentially. We should pause and carefully consider each step and decision we make, asking how it contributes to a convergence of technology and humanity in the near term. But who has time to pause?

The future is happening now. In 2050, the Moon will function as Earth's off-planet command center and launchpad to Mars & beyond. Nuclear reactors will be as critical and commonplace to computing as chips. Psychedelics will sit alongside code & medicine as tools for mental optimization. These are not isolated advancements, they are converging into a new architecture for civilization, reshaping how we power, govern, heal, and expand. What emerges isn't just a smarter society, it's a stranger, faster, more ethically complex one. The biggest opportunities won't lie in inventing the future; they will lie in learning how to live within it, and choosing to make it better.

Methodology

We identified five Red Threads in the Predictive Quarter of 2025 which frame a future where the radical shift of technology converges with humanity and the choices about the technological shift. Some of these choices we can make, some we should make, and some are being made for us. We explore this convergence, and what it means for our future through these five Red Threads.

1. The Moon: No Longer Far Away
2. Embodied AI: Rise of The Mirror World
3. Synthetic Everything - Living Intelligence
4. Biohacking: Don't Die. Ever.
5. Testosterone: The Chemical of the Year
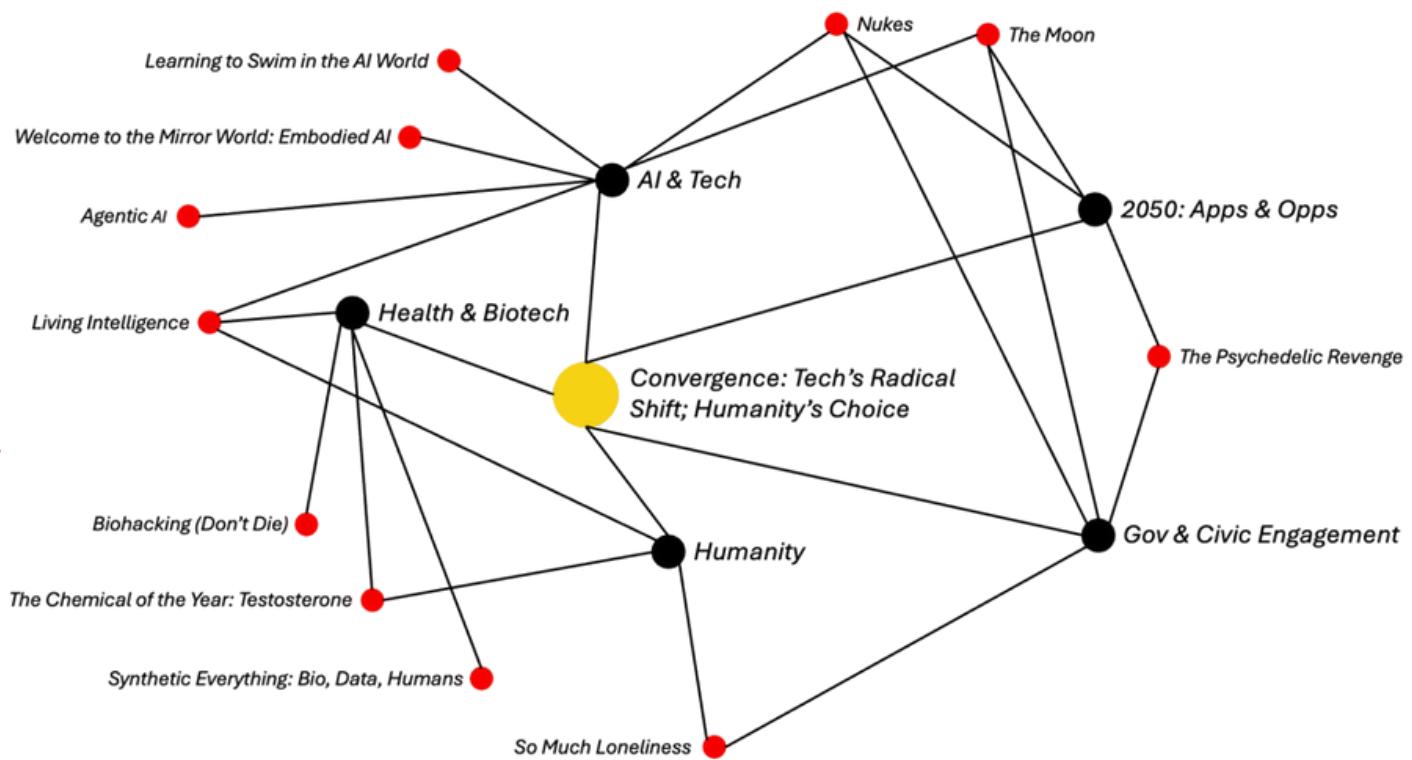
The Moon: No Longer Far Away

By 2050, the Moon won't be far, it'll be foundational. The question isn't "What are we doing on the Moon?" but "How will the Moon reshape everything we do on Earth, and beyond, and how can we ensure this reshaping leads to better outcomes?"

The Moon is evolving from a remote scientific outpost into a critical economic infrastructure. In 1950, Robert Heinlein predicted that private enterprise, led by business tycoons, would commoditize space and the moon for economics and personal accomplishment. His envisioned future is eerily prescient as major corporations race to dominate orbital space with commercial rockets and payloads and early movers launch and deploy lunar payloads. In early 2025, the world watched as Firefly Aerospace successfully landed its Blue Ghost Mission 1 on the moon. At the same time, Lone Star Data Holdings are laying the groundwork for lunar data centers, leveraging the Moon's stable, atmosphere-free environment for secure global data backup and restoration while other companies are striving to build mobile networks on the moon. These facilities will anchor a broader cislunar economy, complete with AI-powered logistics, autonomous operations, and resource extraction.

Space activity is increasing, leading to more congestion which heightens both competitiveness and risk. McKinsey & Company forecasts the global space economy could be worth $1.8 trillion by 2035, a significant rise from $630 billion in 2023. With rocket launches becoming much less costly, some experts believe more people and thousands more satellites could soon travel to outer space, marking an unprecedented level of activity. As of January 2025 (before Amazon's first Kuiper launch), nearly 12,000 satellites were estimated to be in orbit, reflecting almost 70 years of human activity in space. Given these factors, tracking space debris is essential to prevent the Kessler Syndrome. This syndrome warns that collisions between satellites or spacecraft and other orbital objects will create more debris, which in turn increases the likelihood of further collisions, forming a compounding belt of space junk. Such a debris belt would dramatically impact our satellite-based capabilities and severely limit future human space activity, a scenario depicted in the science fiction movie "Gravity."

Cislunar space is rapidly becoming a key economic frontier. This growth is driven by private sector initiatives in several areas. These include orbital supply chains, space tourism, and the deployment of manufacturing and power generation infrastructure in orbit and on the Moon. Lunar resource exploration is also a significant commercial focus. Some firms are even considering novel ventures like space-based advertising. However, this rapid innovation starkly contrasts with lagging governance and regulation for space and lunar activities. This growing disparity between commercial ambition and effective oversight presents challenges for sustainable development and long-term strategic planning in the cislunar domain.

SXSW2025: The Moon

Artist rendering of Firefly's Blue Ghost lander on the lunar surface. (Image credit: Firefly Aerospace)

https://www.theguardian.com/science/2024/feb/22/us-moon-landing-odysseus-intuitive-machines

https://noirlab.edu/public/images/noirlab2322d/

NASA

Firefly Aerospace Blue Ghost lander carrying 10 NASA science payloads to the Moon launched from Florida in January successfully landed, achieved 100% of its mission successfully, and entered 'Monument Status March 17th, 2025
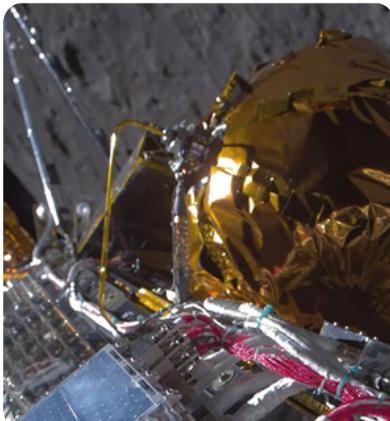
NOKIA BELL

After returning to the Moon early 2024 touching down near the unexplored region of the lunar South Pole, Intuitive Machines lands second robotic mission to the Moon this month, sending another batch of science to the lunar surface and, for the first time, testing 4G cellular service on another celestial body in partnership with Nokia Bell

VERA RUBIN

Vera Rubin Observatory / Chile A powerful new telescope will come online this year to begin a decade-long survey of the southern sky. Inside is the largest digital camera ever made for astronomy, which will snap photos continuously for years to help astronomers study dark matter, explore the Milky Way, and untangle other cosmic unknowns (MIT)

The Moon will serve as a training ground for Mars, hosting comms relays, habitats, and in-situ resource testing. But with commercialization rising, new geopolitical tensions and legal disputes over lunar land, spectrum, and cultural heritage are inevitable, demanding we establish improved and modern governance over that which currently exists (circa 2019). Military and international competition will only increase as countries and companies seek to exert control over cislunar space.

The Moon is no longer a metaphor for impossibility. It is becoming Earth's off-planet hard drive, logistics hub, and industrial testbed. This represents an unprecedented opportunity for both scientific and technological advancement and boundless economic opportunity. We are wildly underprepared to manage this transition wisely.

- Cyberwarfare Just Went Interplanetary: With data stored off-Earth, digital sovereignty enters a new era. What happens when your backups are 238,000 miles away and potentially in someone else's jurisdiction? Securing this requires a different and possibly unified approach to global cybersecurity.
- The First Fully Autonomous Economy Might Be Lunar: Humans won't build the Moon economy – machines built and guided by humans will. Expect AI-only supply chains, where robotic systems extract, refine, build, and repair without direct human oversight—raising questions about control and resilience.
- A Moon-Based Supply Chain Will Undercut Earth-Based Manufacturing: Zero- and low-gravity manufacturing could make certain Earth-based processes obsolete. The Moon won't just be a backup, it might become a better option for producing rare, delicate, or high-performance materials.
- Delay-Tolerant Networking Will Rewrite the Internet: Continuous lunar-Earth connectivity will demand a resilient new architecture of interplanetary Internet forcing upgrades to global digital infrastructure—an opportunity to build a more robust network.
- The Next Great Legal Land Grab Will Be Lunar: Current laws governing space and the Moon were written in 1967 and 1979, respectively. Rapid advancements demand updates. Without relevant governance striving for a more equitable framework, we risk a "Wild West" in space backed by sovereign funds, private rocket fleets, robots, nuclear powered lunar stations, autonomous systems, and AI agents.
- The Moon Will Shape Earth's Future More Than Most Governments: Lunar developments will dictate terrestrial policy, defense, and industry in ways we haven't prepared for. If you're not thinking lunar, you're not thinking long-term.

2050: The Moon

By 2050, the Moon won't be far, it'll be foundational. The question isn't "What are we doing on the Moon?" but "How will the Moon reshape everything we do on Earth, and beyond, and how can we ensure this reshaping leads to better outcomes?"

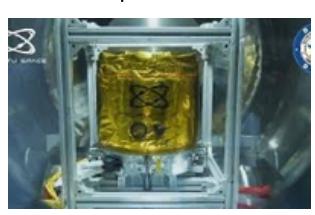## SO WHAT? → SPACE ECONOMY!?

Space Ads

Earth First

Kessler Effect

Sovereignty

Green Propulsion

Mining and Extraction

Space Tourism
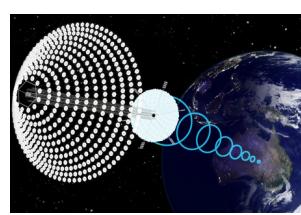
Space Based Solar Power
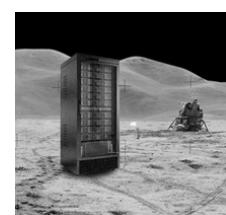
Lunar Data Centers

Zero G Factories

Learn More | The Moon

Future Today
Excerpted Amy Webb
reporting on SPACE

McKinsey
The future of Space: Its
getting crowded out there
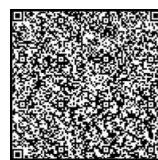
Deloitte xTech Futures
SpaceTech

Moon As A Service   Analysys Mason: Moon-as-a-service' business models: the next
leap for commercial space players

In-Orbit Service   Analysys Mason: In-orbit services: the next step to improving
security in space

Lunar Economy   NASA: NASA is returning America to the Moon through its Artemis
missions

**Private Firms &
The Moon**   BCG: Private Firms Are Helping Explore and Develop the
Moon. This Is Why.

The Moon is Back   Georgia Tech: Experts discuss why we are returning to the lunar
surface, what we might find there, and why the moon matters
for the future of space exploration.

**The Man Who
Sold The Moon**   A science fiction novella from 1950 that envisions a fiction
future where business men compete for control of the Moon.

Welcome Back to the Mirror World:
The Rise of Embodied AI

From Predictive AI to Physical Presence

The Predictive Quarter signaled a radical shift in technology, driven by a new wave of artificial intelligence that is no longer confined to screens or data centers. We are entering the age of the "AI of Things": artificial intelligence embedded into the physical world, biology, and autonomous systems. This new layer of technology is increasingly responsive, adaptive, and agentic.

We are witnessing the rise of intelligent systems that sense, learn, & act in the real world. Embodied AI enables machines to interact with their environments physically and autonomously, blurring the boundary between the digital and physical. As Amy Webb notes, AI is moving from observer to controller, merging with biotechnology to make matter itself programmable.

Artificial Intelligence systems that interact with and learn from the physical world through sensory inputs and actions, through interaction and experience. Much like humans building models of the world through sensory feedback and real-world interaction using robotic or virtual tools to perceive, navigate, and interact with their environment.

This supercycle presents a defining choice: use this power to elevate human potential or risk losing control. The ethical questions of consent, transparency, and autonomy are no longer theoretical. They are urgent calls for us to establish standards and practices now.

Artificial Intelligence is no longer emerging; it's here, accelerating, and rewriting the rules of nearly every industry, role, and assumption we've held about work, intelligence, and value. To "learn to swim" in this world is not just about adaptation, it's about transformation—a challenge to continually think about how we think, how we learn, and evolve. Intelligence is no longer human by default.

MIT TECH 2025
Fast Learning Robots
Robotaxis

NVIDIA COSMOS
Accelerates world model training and data pipelines for AVs and robots

AGENTIC AI
Machines with Intent: Large Action Models: PLAMs (Personal), CLAMs (Corp) GLAMs (Gov)

ROBOTICS
Boston Dynamics predict over 60% growth in robotic autonomy through sensor fusion and AI.

AMAZON
75% of packages delivered have been touched by robots

WAYMO
Machines with Intent: Large Action Models: PLAMs (Personal), CLAMs (Corp) GLAMs (Gov)

ARCHETYPE.AI
Archetype.AI and Newton Model

BIO- ROBOT
Cyber Jellyfish have no pain receptors & Artificial Skin reacts to electronic stimulus

Welcome Back: the Mirror World

The digital world used to reflect our lives. Now it's stepping into them. Embodied AI marks a profound shift from virtual intelligence to physical presence. These are systems that sense, understand, and act in the real world. They go beyond pattern recognition to grasp cause and effect, enabling adaptive machines to interact with their environments in real time.

Embodied AI is reshaping entire industries:

- Fast Learning Robots (MIT Top 10 #7) learn complex tasks in days.
- General Purpose Robots are moving beyond narrow specialization.
- Waymo operates autonomous vehicles in Austin, D.C., and LA.
- Amazon relies on robots for 75% of package handling.
- Boston Dynamics predicts over 60% growth in robotic autonomy through sensor fusion and AI.

The infrastructure powering this shift is equally important:

- NVIDIA's Project Cosmos accelerates world model training and data pipelines for AVs and robots.
- Archetype.AI and Newton use real-world observation to build predictive behavioral models learning how physical systems work by experiencing them.

We're also seeing the rise of hybrid and biological AI systems:

- Cyborg jellyfish and AI-powered artificial skin blur the lines between biology and machine.
- AI is being applied to agriculture, product design (like Lego), and sustainability – all potential avenues to create more efficient systems if guided ethically.

These systems no longer live in code, they live in the world. And they demand new safety, governance, and accountability frameworks. Embodied AI doesn't just process the world, it participates in it.

Living Intelligence (LI)

> "The interaction and intersection of these technologies will create compounding effects, pushing the world into a new phase of technological disruption."
>
> - Amy Webb, "The Era of Living Intelligence"

LIVING INTELLIGENCE

Artificial Intelligence   Advanced Sensors   Bioengineering
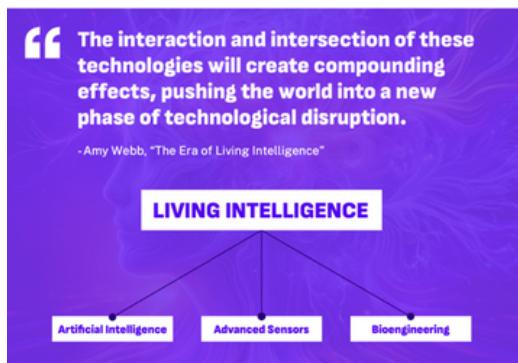
Amy Webb, SXSW2025
The convergence of AI, sensors, and biotech will create intelligent systems that can perceive, learn, and evolve beyond human programming.

LI is a paradigm shift, not a singular invention, but an ecosystem. It merges artificial intelligence, Biotechnology, and ubiquitous sensing into adaptive systems that learn, evolve, and act autonomously across both digital and biological realms. Unlike Artificial General Intelligence (AGI), LI is not centralized. It's networked. It's embedded. And it's already underway with the potential to evolve beyond human programming.

LI draws power from Agentic AI and Physical AI, creating embodied, action-oriented systems capable of real-time perception and response. But its ambitions go far beyond robotics or automation. LI rewires the interface between humans and machines and challenges our understanding of autonomy, embodiment, and consent.

LI doesn't just change systems. It absorbs them. It alters how we build, how we heal, how we decide, and what it means to be alive, demanding we actively steer it towards making the human experience fundamentally better.

This isn't innovation, it's escalation. Living Intelligence doesn't just change systems. It absorbs them. It alters how we build, how we heal, how we decide, and what it means to be alive, demanding we actively steer it towards making the human experience fundamentally better.

- Healthcare won't treat symptoms, it will reprogram biology. From CRISPR to AI-guided gene therapies to smart implants, the body becomes a modifiable platform. What does patient consent mean when intervention happens before diagnosis?

- AI will no longer be on screens, it will be under your skin. Neural implants, thought-to-text tools, and brain-machine loops will transform cognition into code. The very act of thinking becomes an interface. Can this improve thinking? Will it change our thinking? Make us stronger or more vulnerable? Do we need to think - and if we don't think, therefore, are we?

- Labor and agency collapse into question marks. When programmable cells farm themselves, microbots perform surgery, and AI manages your biorhythms, what roles - and what choices - remain human? How do we maintain agency and purpose in this future?

- Risk explodes. Living systems can't be patched like software. A hacked neural implant isn't a data breach, it's a mind breach. A faulty gene drive isn't a product recall, it's an ecological cascade. Managing these risks requires a more proactive approach to safety and ethics.

- The governance gap is enormous. Institutions are preparing for AI as automation not as sentient infrastructure. Regulation lags by decades. Ethics expire before the paper dries. We desperately need more adaptive governance.

Living Intelligence

Living Intelligence will transform medicine from reactive to predictive and preventive. Amy Webb describes this transformation as the rise of programmable biology, where sensors, AI, and genomics form an intelligent scaffold that continuously monitors and reshapes biological function.

Netri is revolutionizing drug discovery by merging "organs-on-chips" technology with artificial intelligence to digitize human biology. This accelerates the assessment of drugs and compounds for dermo-cosmetics, pharmaceutical, and food health industries. Utilizing human neurons as bio-digital sensors, Netri observes the curative effects of new molecules in ways previously impossible, digitally transcribing product toxicity and efficacy on innervated target organs like the skin, lung, brain, liver, and heart. This dramatically speeds up discovery and pre-clinical research, reducing clinical phase failure rates by 85%.

Scientists from Seoul National University's College of Engineering created soft robots that replicate cellular functions. In addition to imitating the T-1000 Terminator's ability to slip through metal bars, the soft robots can pick up and carry foreign objects. This opens new pathways for drug delivery to minimally invasive procedures.

Edge computing and advanced power systems will drive a proliferation of real-time sensors. Synseer's neural processing units embedded in smart devices will create continuous, high-fidelity data streams that allow precision medicine to become proactive. The convergence of environmental data, physiological monitoring, and genomic information will enable predictive diagnostics and personalized interventions – a potential path to better individual and public health, if implemented equitably.

But with this acceleration comes risk and deeper questions:

☐ *Click this box to agree to the terms and conditions set forth in the EULA and continue reading this report.*

Do you know what you just did? What did that EULA just sign you up for when you unboxed and connected those new smart glasses? They're sleek and designed by a legacy fashion brand, powered by a major tech firm. Seamless access to embedded visual and auditory AI, synced with your accounts. Music, conversation, navigation, all without touching a screen. I'm in...

But what did you trade for that convenience?

What happens when the visual data from those glasses meets your smart watch's biometric readings, your car's driving logs, your credit card history, and your phone's location stream? Are we engineering a better life or a more efficient surveillance net? This is the core tension.

Living Intelligence may create beautiful, seamless, hyper-personalized systems for human longevity and wellness. But those same systems can recalibrate your insurance premium in real time or decide whether you're eligible for a medical procedure based on lifestyle modeling and micro-decisions you didn't know you made. Does convenience equal better?

We already swap out hips and knees. Next up: liver cells, heart tissue, synthetic blood. Why not organs? Why not organisms? Bodyoids may redefine our definition of 'spare' and refer to available organs and body parts we can exchange as easily as we change our car's tire. Who has access to these 'spares?' Will this create a new definition of the 1% - those with the means to exchange organs and live longer and healthier separated from those who cannot?

Or perhaps more unsettling, what happens when a neural implant can learn from you, adjust your behavior, and synchronize with a global database of biosignals... without ever asking permission again?

Living Intelligence offers power, longevity, and precision. MIT envisions stem-cell therapies that work (MIT Top 10 #10) with experiments showing effectiveness helping epilepsy patients and type 1 diabetics. These are incredible advancements but they demand something in return: our trust, our data, and perhaps, eventually, our agency.

It's not just the future of technology. It's the technology that defines the future of life, and whether that future is truly better.

Agentic AI: Machines with Intent

From Predictive AI to Physical Presence

Agentic AI refers to systems that understand goals, make decisions, and act with minimal human input. Unlike narrow AI, these systems operate intentionally, adapting to environments and solving dynamic problems. They are already reshaping industries:

- Smart assistants that take proactive steps.
- Autonomous logistics and healthcare tools.
- Multi-agent systems that collaborate in real time.

Agentic AI is also scaling up through the rise of Large Action Models: PLAMs (Personal), CLAMs (Corporate), GLAMs (Government). These models won't just interpret language, the models will execute plans, coordinate across platforms, and act in the world on behalf of users, organizations, and states, making the need for ethical alignment and control.

"By 2030, more than 125 billion connected devices will generate continuous behavioral data, fueling LAMs' ability to learn and act autonomously" - FTSG 2025 Tech Trends Report

Supporting this shift are technologies like Mintrobot, middleware that allows diverse robots from different manufacturers to be controlled through a unified interface. This coordination is key to building truly intelligent agentic systems.

These intelligent agentic systems using Mintrobot middleware could one day vacuum our homes or make sandwiches. These are the promised tasks of the Protclone from Clone Robotics. The Protcloner is a robot with 1,000 artificial muscles and 500 sensors that sweats. It performs complex movements with fluidity. Not yet commercialized, but it highlights AI integration into our physical lives and the potential of what is to come.

As Agentic AI becomes embodied, we inch closer to Artificial General Intelligence machines that not only think, but do, with autonomy, adaptability, and purpose. The Bickit app recommends builds from an image of a pile of random Legos. The DJI Mavic 3M is a drone that captures differences in crop potential and makes recommendations to reduce costs, increase yield, and protect the environment. These are amazing and useful applications.

Axelera.ai provides AI-based video analytics to enhance security measures, unrestrained facial recognition. Other companies, like visio.ai provide facial and image recognition or object detection, training on the growing availability of visual data on the web, captured by our smartphones and posted to social media, or captured by security cameras. What comes of this? Who has access and who, or what, chooses how to employ what is learned from passive collection?

"The shift to action-based AI will create autonomous systems that can execute complex tasks without explicit programming, transforming automation across industries" - Amy Webb

⬊ The Choice Before Us

We are re-entering the Mirror World, but it's no longer a reflection. It's a collaborator, a competitor, a co-creator. The line between tool and partner is blurring. The question is no longer "What will AI do?" but "What will we become?"

Embodied AI can help us in many ways: Improving medical outcomes, Securing food supply chains, Mitigating climate change, Augmenting human capability.

But it also brings risks: worker backlash and labor displacement, Privacy erosion and surveillance as a service, Ethical ambiguities in biological augmentation. The potential replacement of human agency.

We are not just building systems, we are building society anew—a society that demands we consciously choose. The tide is rising. The Mirror World is awakening. Learn to swim or risk being swept away... What will you choose?

SO WHAT?

IF YOU'RE NOT ADAPTING, YOU'RE OBSOLETE

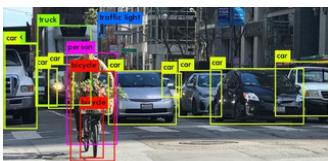|				
Worker Backlash (china)	Partnerbots	Biological Robotics	Universal Basic Income	Better Medical Outcomes
Assault on Privacy	Food Security	Surveillance as a service	Human Replacement	Climate Change Mitigation

Don't fight with AI unless you want to lose

- Jobs aren't just changing, they are vanishing, fracturing, and being reborn in hybrid forms. Today's professionals are unknowingly training their replacements as they use AI daily. The myth of "staying current" is dead. The new competitive advantage is surge skilling - the ability to acquire and apply new capabilities in real time. In the AI current, stagnation equals irrelevance.

- Don't compete with machines - complement them. Trying to out-calculate AI is like racing a jet with a bike. Instead, lean into emotional intelligence, physical intuition, creativity, and ethical judgment. These aren't soft skills, they are survival skills—and the core of how we can maintain our humanity in a world of cold logic and fast decisions.

- *Big data is a blunt instrument. Small data is a scalpel. Incomplete data is a liability.* Massive datasets provide scale but lack specificity. Precision now comes from curating small, high-quality, context-rich data, the kind AI struggles to generate. Your lived experience and organizational knowledge are now vital components of any smart system aiming for improved insights. When data is no longer sufficient, synthetic data will allow models to train, learn, and execute before interfacing with the physical world.

- *Traditional success metrics are failing fast.* Efficiency and scale are giving way to adaptability, creativity, and ethical agility. The future belongs to those who can respond to change with insight, act with integrity, and build with intention—a call to leaders and organizations. Human values are strategic differentiators in a world driven by automated decision-making.

- *The AI world won't wait.* If you're waiting for best practices, you're already behind. Early adopters shape the new norms from policy to culture and industry expectations. The real risk isn't AI going too far, the risk is us not going far enough with intentionality and ethical foresight. Innovation without intention is dangerous. But hesitation is deadly.

Learn More | Embodied AI

Archetype AI	Link to learn more about Archetype AI	
The Brad King Blog	Brad King: Living Intelligence: The Era of Robots Has Finally Arrived (Day 2 at SXSW)	
Wired Magagize	"AR Will Spark the Next Big Tech Platform—Call It Mirrorworld" by Kevin Kelly 2019	
McKinsey	The AI Revolution will be 'virtualized'.	

Synthetic Everything:
Biology - Data - Humans

"The combination of the access to compute, AI, and synthetic biology; that intersection is the most powerful set of technologies, and potentially the most dangerous set of technologies the world may ever see" - Ben Lamm

Ben Lamm's stark warning encapsulates the profound implications of the converging fields of synthetic biology, artificial intelligence, and unprecedented computational power. This intersection is rapidly unlocking capabilities that were once confined to the realm of science fiction, offering solutions to some of humanity's most pressing challenges while simultaneously raising fundamental ethical questions about the nature of life, data, and human agency. Synthetic biology, at its core, empowers us to design and engineer biological systems for specific purposes. This capability, amplified by AI-driven design and analysis, is manifesting in groundbreaking innovations across diverse domains, challenging us to ensure these innovations lead to genuinely better outcomes.

ai + biology = ?

The assembly of novel biological systems or organisms with functionalities not found in nature can be profoundly beneficial to our planet and species, or equally devastating as these novel systems interact with the world and adapt to it. The far-reaching effects of these systems are emerging around the world at an astonishing pace, with incredible potential benefits.

Addressing Environmental Challenges

Consider X-32 a testament to this power, demonstrating the potential to engineer biological systems capable of degrading recalcitrant synthetic polymers like polyolefins, polyesters, and polyamides. This offers a biological pathway to address the global plastic pollution crisis.

Transforming Data Storage

Beyond manipulating existing biological forms, this convergence is also exploring novel ways to store and utilize information. DNA data storage, leveraging the immense density and longevity of DNA, presents a revolutionary alternative to traditional data storage methods. AI plays a crucial role in encoding, decoding, and managing this biological data storage, blurring the lines between the digital and the biological.

De-extinction and Species Revival

We already discussed the work of Colossal Biosciences and their de-extinction projects. This raises questions and possibilities. They are attempting to bring back the Woolly Mammoth - is Woolly Mammoth meat nutritious? Does it taste good? Can we bioengineer Woolly Mammoths to not burp methane? Or can we use this technology to bioengineer cows to have more lean meat and not burp methane, improving food supply and helping the environment?

Exploring Novel Biological Computation

The convergence extends beyond traditional biological systems. The emergence of organ intelligence, the concept of harnessing the computational power of biological tissues, and the development of bodyoids - "spare" human bodies - with three-dimensional in vitro models of organs that can exhibit complex biological functions, representing radical new frontiers. These advancements could revolutionize drug discovery, disease modeling, and even lead to bio-integrated computing, blurring the lines between living systems and computational devices.

Revolutionizing Protein Design

The synergy with AI is further exemplified by advancements like AlphaFold. This AI breakthrough has revolutionized protein structure prediction, a cornerstone of biological understanding and engineering. By accurately modeling the three-dimensional shapes of proteins, AlphaFold significantly accelerates the design of novel biological parts and systems for synthetic biology applications, opening doors to new drug discoveries and biomaterial innovations.

Advancing Gene Therapy

The ability to precisely deliver and modify genetic material is another critical aspect. Virus delivery systems, refined through synthetic biology and guided by AI for targeted delivery, hold immense potential for gene therapy and the development of novel therapeutics. This precision targeting is crucial for minimizing off-target effects and maximizing therapeutic efficacy, paving the way for more effective and improved treatments for genetic diseases.

Understanding Biological Complexity

The power to manipulate biological systems also brings inherent risks. The Christchurch Mutation, a naturally occurring genetic variation conferring heightened pain insensitivity, serves as a potent reminder of the complex and sometimes unpredictable consequences of even single genetic changes. As we gain the ability to engineer more complex biological modifications, understanding and mitigating potential unintended outcomes becomes paramount.

Harnessing Nature's Nanomachines

Finally, understanding the fundamental mechanisms of life at a molecular level, such as the intricate workings of flagellar motors – the biological nanomachines that power bacterial movement – provides crucial insights for bio-inspired design. By deciphering these natural systems, we can engineer novel synthetic systems with unprecedented levels of control and functionality, potentially leading to new forms of biomimetic technology.

Synthetic EVERYTHING

The Biotechnology Acceleration

These examples underscore the transformative potential of the intersection highlighted by Ben Lamm. However, they also implicitly raise critical ethical considerations. As we harness the power to manipulate life, process vast amounts of biological data with AI, and potentially create new forms of biological intelligence, the need for robust ethical frameworks and governance mechanisms becomes ever more urgent. Without careful consideration and a proactive commitment to steward this power responsibly, these technologies could prove to be the most dangerous the world has seen, capable of reshaping not only our environment and our bodies but also the very definition of what it means to be human.

We live in a world where we are surrounded by real data and continuous data exchange. Data is generated and stored in devices and transmitted back and forth between devices, the cloud, AI tools and servers/stores around the world (and now off Earth) via radio waves, internet transfer protocols, and more. We are fully measured and fully connected...and the data we generate is being analyzed and used in ways we can't measure much less fathom.

COLOSSAL

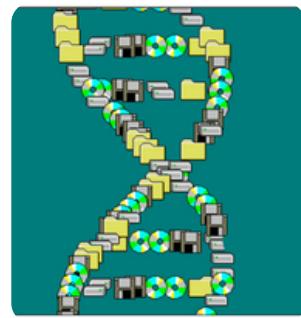From Dire Wolf to Wooly Mammoth by AI and bio-synthetic combination
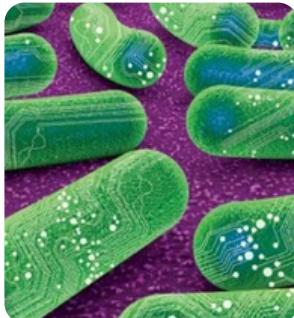
BIO-SYNTHETIC

A combination of genomics, computing and engineering that synthesizes the design and editing of genetic code on a PC to create standardized biological parts

VIRUS DELIVERY

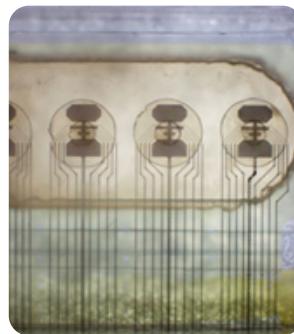Adenovirus -Delivering genetic material without altering genome

DNA DATA STORAGE

Storing data using two integers: 1's and 0's. DNA stores using 4: ACTG

EPIGENETICS

Tune Therapeutics are developing CRISPR-based epigenetic editing tools to treat conditions like chronic pain, neurodegenerative disorders, and cardiovascular diseases

ORGANOID

Electrodes connect living neurons to conventional computer networks to create the organoid. Neurons are trained with dopamine and electrical stimulation prompting them to form new pathways and connections much in the same way a living human brain appears to learn.

CORTICAL LABS

The world's first code-deployable biological computer. Real neurons (6 month lifespan) are grown directly on chips, creating an intelligence that learns intuitively, with remarkable efficiency.

GOOGLE ALPHAFOLD

Free AI Model to predict the structure of all of life's molecules

Will it be more Human than Humans?

As this real data is applied, we are entering a world where data is synthesized to rapidly expand the available training sources for the AIoT, where AI as we currently know it enters the physical world through autonomous, AI-enabled systems that operate without human intervention. Soon, the data will be real, generated from living intelligence, but what bounds or defines living intelligence and usable data? Is living intelligence confined to a physical domain, a data connection point, or how it is transmitted or stored? And who owns what data in this chain?

LLMs are reaching the limits of available data to incorporate for training, prompting industry leaders to employ synthetic data, artificially generated data designed to mimic real-world data but without real-world events or sensitive information. Created algorithmically, synthetic data is used for tasks like validating models from bioscience to finance, training machine learning algorithms, and protecting privacy by anonymizing data. Projects like NVIDIA Cosmos – a platform of advanced tokenizers, guardrails, and an accelerated data processing and curation pipeline – are built to provide world foundation models (WFM) to accelerate physical AI development and training for autonomous vehicles (AVs) and robots.

As LI rapidly builds the real data set around us as individual humans, at what point will quantum-powered AI begin to synthesize data about, or for, us? And what health, biotech, relational, financial, or other decisions will that data inform, drive, or make, via human or AI, on our behalf? Might our insurance company decide to harvest an organ and replace it with a synthetic one because a more "valuable" insured needs a live organ, and we are, in their value model, a "prime candidate for synthetic organ replacement to harvest biologic material" or some bureaucratic assessment like that?

Conversely, could that decision be solely to our benefit? A heart with 50% blockage could be easily replaced before any cardiac events jeopardize your physical body or risk your cognitive functioning. Most alarming is not the range of positive and negative applications of this convergence. Rather, it is simply the lack of governance or regulation in this fast-moving, dynamic point in human history on a topic that is fundamental to our being.

Despite the incredible volume of data each person generates, our current environment defers to industry leaders to set and enforce parameters for their AI and technology using our data, and motivations are based primarily on individual and corporate interests. As AI grows, learns, and creates the data with which it trains, we may quickly approach a point where machines go beyond the control (or lack thereof) in industry and consume our agency. Simultaneously, AI and technology's reach into the individual through data collection and system integration grows daily. AI learns and knows more about us each day and is gaining increasing agency over us.

We are currently developing and deploying these technologies without clear guardrails, and AI could reach the point, soon, where it no longer decides with us, based on data we choose to provide and parameters we set, but for us with data it created or selected and parameters set by others, potentially industry stakeholders, or AI itself.

The convergence of longevity and biohacking, healthspan, and advanced synthetic biology will amplify an already existing problem. The imbalance between supply and demand is the underlying cause of the organ shortage crisis, with more than 100,000 patients currently waiting for a solid organ transplant in the U.S. alone.

As lifespans and healthspans increase, potentially adding 40 years or more to human life, organ reliability and replacement will become an even greater problem. The emerging capacity to grow synthetic organs, whether in labs or on or in host organisms (human teeth grown in pigs, for instance), will help resolve the shortages of organs for transplant. And the increased wear and failure of organs over time (how well will 100 year old eyes function) will only increase the demand for replacements.

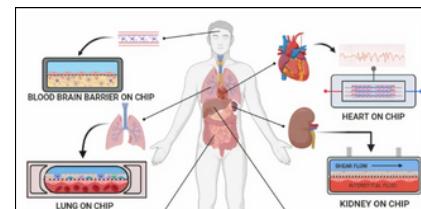> ## MIT 10 Tech Trends
Stem-cell therapies

> ## Cortical Labs 2022
Brain cells in a lab dish learn to play Pong
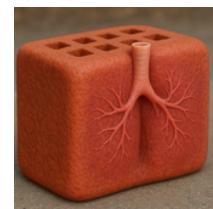

> ## Organs on Chips
Netri, France: Innervate. Screen. Predict.

> ## Lung Bricks
Buildings that breathe by Amy Webb

Will it be more Human than Humans?

As synthetic biology advances and lives extend, the economic and ethical factors associated with preserving quality of life as humans live longer will present an opportunity for the advanced technologies Ben Lamm described. Besides growing organs in host environments, whether pharmaceutical or organic, scientists are already developing bodyoids or "spare" human bodies where brainless humanoid bodies can grow and host organs for harvesting and transplant.

The philosophical and moral considerations are mind-bending: are these bodyoids human if the genetic underpinnings are identical? How are they "born," and how are they "raised?" What do you call the facility growing these bodyoids for future organ harvesting? And what transpires when the last usable organ is harvested, or the bodyoid can no longer host and sustain organs? Do bodyoids die? And how do you ensure and prove there's no sentience in the bodyoid?

From a transactional perspective, a number of equally important questions emerge. What is the cost of a bodyoid, and how does the supply chain and value proposition map for potential organ recipients? How will the data freely provided via Living Intelligence inform decision-makers like your health care provider and insurance company to assess your place on the value chain for an organ transplant? Will "real" organs from humans who were born via a birth canal demand a premium over engineered and grown organs? Or will the opposite hold true?

As this technology emerges, a final set of questions holds true, regardless of one's ethical and transactional view: how will we protect the labs, hosts, or bodyoids from the many nefarious actors who will seek to exploit or disrupt this technology? Imagine a hacker modifying genetic code or implanting programmable bacteria in the organ supply chain. What if that supply chain supports a particular group or institution, say, government or military leaders? How might that embedded code or bacteria be leveraged against the individual or institution? The potential for biologic hacking and cyber-like exploitation increases exponentially as the supply chain for human parts becomes more decentralized and commoditized.

It's easy to recognize the benefit to humanity of an endless supply of spare organs as well as the economic opportunity of being on the supply side, but the moral, ethical and practical considerations may be an afterthought as this technology rapidly advances as another output of the rapid converge of synthetic bio, advanced computing, and powerful AI.

"What is real? How do you define real? If you're talking about what you can feel, what you can smell, what you can taste, and see, then real is simply electrical signals interpreted by your brain." - Morpheus

Bodyoids
No Brains, No Pain

Metamaterials
Meat Rice: Materials don't follow the rules

Bending Physics' Laws
Life is Reprogrammable: Bacteria Batteries

SO WHAT?

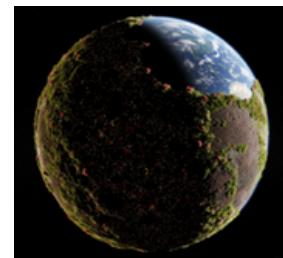'MORE HUMAN THAN HUMANS'

Lab Grown Organs

New Cuisine

S.P.E.C.T.R.E.
Level bioterrorism

Terraforming the Moon

Obesity Cured

Cancer Vaccines

Methane Free Cows (no GHG's)

Eradication of Invasive Species

High Protein Produce

Learn More | Synthetic Everything

The Visual Capitalist	The Virtual Capitalist: Explainer: How Synthetic Biology is Redesigning Life	
FTSG2025	FTSG 2025 Tech Trends Report: Biotechnology Chapter	
StarTalk Podcast	Neil deGrasse Tyson and co-hosts Chuck Nice and Gary O'Reilly explore organoid intelligence	
Harvard Business Review	"Why 'Living Intelligence' Is the Next Big Thing" by Amy Webb	
University of Cote D'Azur	How to store Data on DNA Science Clinic 2024	

Biohacking: Life Span

"We should be training for a decathlon of sorts...a decathlon of life...optimizing your later life" - Dr. Peter Attia

The human quest for longer life is no longer just a philosophical pursuit—it's a scientific frontier, intrinsically linked to the aspiration to continually improve while living longer. Advances in biotechnology, regenerative medicine, and cellular reprogramming are converging with AI to stretch the limits of what a human body can endure, recover from, and even reverse. The goal is no longer just Lifespan but Healthspan: a life not only longer, but stronger, healthier, and more capable.

Visionaries like Ben Lamm are engineering this new reality, launching biotech startups focused on de-extinction and synthetic biology. Colossal Biosciences, co-founded by Lamm, recently announced a significant breakthrough in de-extinction with the birth of three genetically engineered wolf pups exhibiting traits of the extinct dire wolf. Using ancient DNA extracted from 13,000 and 72,000-year-old fossils, the company edited 20 genes in gray wolves - dire wolves' closest relatives - to instill dire wolf characteristics. The embryos were then implanted in surrogate dogs, resulting in the birth of Romulus, Remus, and Khaleesi. This demonstrates the power to reshape biology itself.

Popular Mechanics, April 2025

While human ingenuity pushes the boundaries of biotechnology, nature itself offers profound examples of longevity, regeneration, and genetic adaptability that could inspire future breakthroughs. Consider the octopus, a creature of remarkable intelligence and biological uniqueness. With approximately 33,000 protein-coding genes (10,000 more than humans) the octopus possesses a complex genetic toolkit. Even more astonishing is its ability to extensively edit its RNA, effectively reprogramming genetic information on the fly without altering the underlying DNA. This sophisticated mechanism allows for rapid adaptation to environmental changes, a capability that, if understood and harnessed, could offer new pathways for enhancing resilience and therapeutic intervention in humans.

Similarly, the Turritopsis dohrnii, often dubbed the "immortal jellyfish," exhibits an extraordinary life cycle. When faced with injury, environmental stress, or even the brink of death, this tiny hydrozoan can revert its cells to an earlier polyp stage, effectively recycling its cellular structure and beginning its life cycle anew. This process of transdifferentiation, where mature cells transform into different cell types, offers a tantalizing glimpse into cellular rejuvenation that current regenerative medicine can only dream of. These natural wonders underscore that the building blocks for extended healthspan and even biological reversal may already exist, awaiting deeper understanding and ethically guided application.

Biohacking: Health-span - Med 3.0

Meanwhile, physician Peter Attia and entrepreneur Bryan Johnson have reframed the conversation: living longer isn't the goal unless you're also living better. That means extending the functional years of life, not just the number of years lived. Attia's Medicine 3.0 approach emphasizes proactive, personalized healthcare strategies aimed at preventing chronic diseases and optimizing health-span.

MED 1.0
Pre Scientific: Superstition
- Blood Letting
- Amputation
- Humours

MED 2.0
Scientific Thinking: Inquiry
- Acceptance of germ theory
- Statistical machinery
- Enable randomized control trials

MED 3.0
From Reactive to Proactive
- Prioritizes preventative measures
- Identify & address underlying risks
- Tailored treatment plans
- Leverages advanced technologies (AI & machine learning)

The de-extinction efforts pioneered by figures like Ben Lamm at Colossal Biosciences, utilizing advanced genetic editing informed by ancient DNA, are already demonstrating the power of AI and computational biology to interpret and manipulate complex biological systems. Imagine applying similar AI-driven analytical power to unravel the intricate genetic and cellular mechanisms of organisms like the octopus and the Turritopsis dohrnii. AI could be pivotal in decoding the principles behind the octopus's RNA editing or the jellyfish's cellular recycling, translating these natural strategies into interventions that could significantly extend human healthspan.

If successful, such AI-enhanced bio-inspiration could lead to therapies that not only repair damage but actively rejuvenate tissues and organs, pushing the boundaries of what we consider our functional lifespan. This, in turn, would inevitably reshape societal structures. For instance, the prospect of humans maintaining robust health and cognitive function well beyond current norms could lead to a re-evaluation of retirement ages. If individuals can remain healthy, engaged, and productive for longer, traditional timelines for career progression and cessation may become obsolete.

But if science is accelerating, the social systems are lagging. Longevity breakthroughs raise urgent questions requiring us to define better societal structures:

- Access: Who gets to have better healthspans? Will elite longevity become a luxury good, further widening the chasm between the haves and have-nots?

- Organ resilience: Will the future body be a hybrid of biology and synthetic materials? Can we preserve the biological age of our organs—or simply replace them?

- Healthcare economics: If we push life expectancy to 120, who pays for the extra decades of care? How will insurers, providers, and governments shift to accommodate longer, more complex lives in a way that is sustainable and better for society?

- Extended lifespan = longer workspan: With longer lives, at what point will older generations relinquish power and position to the generations following them? Baby Boomers as septuagenarians and octogenarians are holding on to great wealth and corporate and government leadership responsibility, blocking members of subsequent generations from the opportunities to lead and accrue wealth. How will this manifest when generations live a functional life of 100 years or more?

Biohacking: Don't Die. Ever.
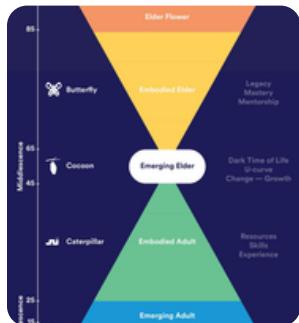
MIDLIFE SPAN
Chip Conley, Founder & Executive
Chairmen of MEA
Financially Secured
Stay Healthy
Make Friends

FORMULA
Bryan Johnson, Tech CEO
Sleep
Exercise
Diet
Community
Measurement

CANCER VACC
Lennard Lee, an NHS oncologist,
anticipates the approval of the first
personalized mRNA cancer vaccine
by the end of 2025,

ECONOMY
Warren Buffett retired at 94
A 95-year horizon allows 55 extra
years of compounding compared to
40 years. At 6.37% annual returns,
money doubles every ~11.3 years

Extending retirement to 120 under 20th-century market conditions would amplify wealth accumulation exponentially due to compounding returns, far surpassing the linear earnings increase.

Wealth Accumulation Comparison			
Metric	Retire at 65	Retire at 120	Growth Factor
Total contributions	$400,000	$950,000	2.38x (linear)
Portfolio value	$1.55M	$49.19M	31.7x
Exponential gain	-	-	+3,070%

Perplexity

Like 'immortal jellyfish', AI could be pivotal in decoding the principles behind the octopus's RNA editing or the jellyfish's cellular recycling, translating these natural strategies into interventions that could significantly extend human healthspan. At injury or death, Transdifferentiation 'recycles' cells to entirely different specialized cells, returning them to the polyp stage, a process that could that could help scientists replace cells that have been damaged by disease.

Popular Mechanics, April 2025

Longevity doesn't exist in a vacuum; it collides with food security, climate adaptation, and generational economics. A longer life with poor air quality, ultra-processed diets, or fractured communities isn't a gift, it's a burden. And with social bonds already strained, we must confront an overlooked truth: the strongest predictors of healthspan aren't just physical, they are emotional. Deep relationships, social purpose, and mental health predict a longer, better life more powerfully than diet or exercise alone.

This introduces a paradox: as we engineer biological longevity, we risk eroding the very human fabric that sustains it. Extended lives without deeper human connection may prolong existence, but not vitality.

If biohacking becomes a tool for personal optimization at the expense of social cohesion, the future we build may be biologically advanced, but spiritually bankrupt, and certainly not improved.

The challenge ahead is not to delay death, but to redesign life—to ensure that longer lives are not just possible, but worth living, making a conscious choice for a truly better existence.

SO WHAT?

SOCIAL IMPACT

Who pays for the extra decades of care?

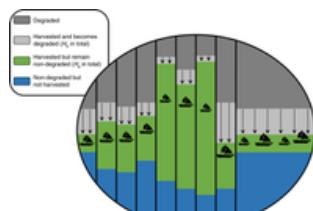100 year old Marathoners

Extended lifespan Longer workspan

Immortals: the new 1%

Retired and Hyper-wealthy

Accelerating Peak Resource

Generational Gridlock

Learn More | Biohacking

Immortal Jellyfish	Popular Mechanics: "Scientists Found a Sea Creature That Cheats Death. Is This the Key to Human Immortality? April 2025		
Peter Attia	The Science Behind Living a Longer, Healthier Life - Peter Attia SXSW 2025		
Bryan Johnson	'Don't Die' - Bryan Johnson SXSW 2025		
Ray Kurtzweil	AI escape velocity: A conversation with Ray Kurzweil March, 2024		

Testosterone:
The Chemical of the Year

"Young men are sequestering themselves from society. They are not attaching to work. They are not attaching to school. They are not attaching to relationships. They become exceptionally prone to conspiracy theory, misogynistic content, and by the time they're 30, they haven't been married or cohabited with a partner."
- Scott Galloway

Testosterone is vital to a person's physical, mental, and emotional well-being, sexual health, and longevity. While low testosterone is linked to health problems that can shorten lifespan, the impact of manipulating testosterone levels (beyond addressing a genuine medical need) on overall longevity is unclear. As testosterone's impact on longevity is further explored and understood, its short-term importance on well-being cannot be understated in striving for improved quality of life.

Perhaps most important is that testosterone influences mood, energy levels, and cognitive function, with sufficient levels generally associated with better mood, reduced fatigue, and sharper thinking. Low testosterone can contribute to depression, anxiety, and decreased motivation, all of which can negatively impact quality of life in an era of increased isolation.

The societal impacts of testosterone are emerging as a factor in the current state of gender dynamics, education, economics, and politics worldwide. As women ascend globally faster than men, multiple trends indicate a worsening condition for young men. Young men are getting fewer college degrees, are not as engaged at work or school, and are not socially or sexually engaged - with a drop in reproduction by men in recent years.

Professor Scott Galloway described this trend, declaring Testosterone "The Chemical of the Year for 2025," in part as a metaphorical reference to the declining role of young men in society with their disengagement from societal pillars and loss of key elements of psychological well-being.
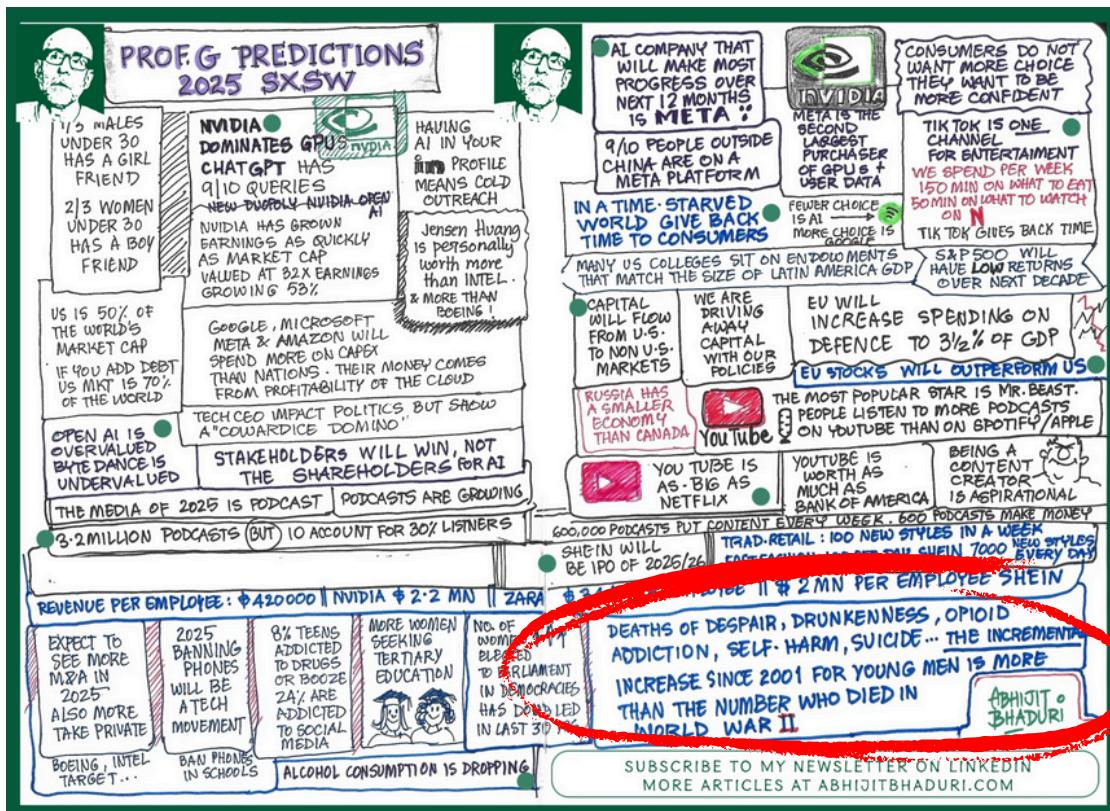
Testosterone: Young Men in Crisis

Galloway also points out a significant disparity in relationships in that "one in three men under the age of 30 has a girlfriend. Two in three women under the age of 30 have a boyfriend. And you think, well, that's mathematically impossible. It's not, because women are dating older because they want more emotionally and economically viable mates" further amplifying the difficulties young men face finding, forming and maintaining romantic relationships, a cornerstone of a better, more fulfilling life for many.

Ultimately, the decline in traditional male roles, support systems, and male role models undercuts opportunity and value for young men in society, leading to enormous individual, relational, and societal pressure points. As recently as January, 2025, Mark Zuckerberg stated, on a Joe Rogan podcast, that "I think having a culture that like celebrates the [male] aggression a bit more has its own merits that are really positive." With this perspective in the Manosphere, definitions and alignment with masculinity are diverging and manifesting in markedly different ways. In a self-rating of masculinity, 53% of Republicans identified as masculine compared to 29% of Democrats.

Widening gender gaps, both between and within genders, are amplified in social media and driving multiple trends. On one hand, a gender divide appears to be forming between Tradwives, Stay-at-Home Moms, and Modern Women. Trad and Social media (including influencers in each camp) feed into the gap by defining categories, placing women in them, and amplifying differences versus identifying and celebrating commonalities.

On the other hand, numerous pressure points are boiling over for men. Men are four times as likely to die by suicide than women, and 51% of young men have never asked a woman out in person for fear of rejection. The struggles are broader, too, with 18% of American men not graduating from high school, 15% assessing they have no close friends, and 34% of men under 34 years old living in their parents home.

The metaphorical "Chemical of the Year," testosterone, signals a critical societal issue: the disengagement of young men from key social structures, making them susceptible to isolation and potentially harmful online influences ("Internet based on rage"). The alignment of "Tech Messiahs" and the "Gratification Generation" dynamic may offer superficial solutions that smooth over rather than resolving these deepening problems.

YOUNG MALE MEDIA
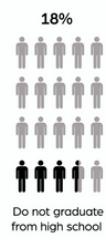

College Enrollment by Gender in 2024
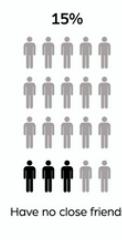
Female **Male**

| 58% | 42% |

Women potentially get better jobs, out-earning men, and expect to date males whom are more successful than their peers.
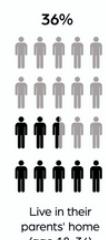
MEN ARE STRUGGLING
U.S.

18%	15%	36%
Do not graduate from high school	Have no close friends	Live in their parents' home (age 18-34)

1 in 3 men under 30 has never had a girlfriend

Suicide is the #1 cause of death for young men in 50+ countries

Boys from fatherless homes are 300% more likely to carry weapons or drugs

Women are out number men in college since 1974

Testosterone: What's now !?

SXSW 2024
Amy Webb warns of 'Tech Messiahs'

The Capitol Hill 2025
'Tech Messiahs' Align

The politicization of masculinity further complicates the issue. Addressing this disengagement and restoring positive social connections is crucial to avoid further societal fragmentation and to help these individuals build better lives. Leveraging technology constructively to facilitate connection and modernize traditional support structures offers a promising path forward.

> Tech-enabled mentorship

Use platforms for virtual/hybrid mentorship, AI matching, and digital resources. Leveraging technology early may reduce barriers to meaningful connection and authenticity.

> Digital community engagement

Employ apps/online platforms to facilitate communication and participation in revitalized local groups as an initial step to bring these groups together to find purpose and camaraderie around their purpose.

> Holistic Online Education

Expand online learning to include social-emotional skills and the role and value of positive masculinity. Ensure young men know their value in society and help them build a positive and productive model of themselves.

> Economic Pursuits

Educate and train young men on the skills and knowledge required to participate in the modern economy. A young man's value is as much a function of contribution as connection. Held define and realize their potential to contribute and benefit in a meaningful way.

> Holistic Online Education

Encourage the risk taking and reward of pursuing personal and romantic IRL relationships; they are the most important element of the human experience and the antidote to the crisis of loneliness because, as Henry Cloud stated, "There is a difference between solitude and isolation. One is connected and one isn't. Solitude replenishes, isolation diminishes."

SO WHAT?

SOCIAL IMPACTS

Widening Gender Gaps

'Dark Woke' Backlash ?
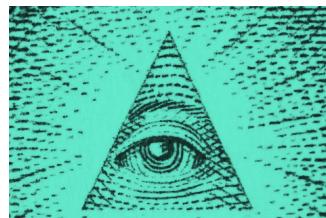
Rise in Conspiracy Theories

Increased Financial Risk Taking
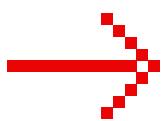

An Imperial Presidency

Protein Everywhere

Protein Coffee

Tradwivery

Emotional Ozempic

Testosterone influences Young Females, too!

Learn More | Testosterone

Scott Galloway   'Prof. G Predictions for 2025 - SXSW25's Stage

Theo Von   This Past Weekend #547 with Scott Galloway and Theo Von

Harward EDU   "Ketamine for treatment-resistant depression: When and where is it
safe?", February 2024

Conscious Convergence:
Tech's radical shift, humanity's choice

"*This is your last chance. After this, there is no turning back. You take the blue pill - the story ends, you wake up in your bed and believe whatever you want to believe. You take the red pill - you stay in Wonderland, and I show you how deep the rabbit-hole goes.*" - Morpheus

We are living through a pivotal inflection point—what we've termed the era of Convergence—where technologies are not merely advancing, but fusing into new forms of intelligence, infrastructure, and existence. Artificial intelligence, biotechnology, quantum computing, and synthetic systems are no longer siloed innovations. They are coalescing into Living Intelligence—<u>systems that sense</u>, decide, evolve, and act with growing autonomy. This isn't science fiction. It's now. And it's accelerating.

The question is no longer what technology can do, but what humanity chooses to become...do we serve the machines or will we choose to be better as individuals, stewards, and a species?

This convergence offers tremendous potential: personalized medicine, abundant clean energy, emotional support in moments of isolation, and the ability to solve problems at a planetary scale with extraterrestrial resources and support—all paths towards a potentially better world. But it also introduces profound risks—of lost agency, systemic inequity, eroded trust, and the commodification of human experience. The systems we are building are not neutral. They reflect our values, our governance (or lack thereof), and our will to shape outcomes that elevate rather than diminish human dignity.

The most disruptive force isn't a single invention—it's the collapse of boundaries: between human and machine, biology and code, private choice and public impact, governance/regulation and a free market approach. This collapse demands we establish 'Better' boundaries based on conscious values.

As data becomes destiny and autonomy migrates from person to platform, we must decide: Will we lead with intention, aiming for an improved future, or be led by inertia into one we didn't choose?
The radical shift is underway. The choice is ours—but the window to shape it is narrowing.

This is not just a report. It's an urgent call to action:
* To build with foresight, not just speed, aiming for more sustainable progress.
* To center ethics and equity in design, not as afterthoughts, defining technological advancement in human terms.
* To recognize that the real innovation isn't just in what we create—it's in how we choose to live alongside it and remain human.

Convergence is not destiny. It is a decision. And the future will be defined not by what technology does next—but by what we choose to do now. The choice to actively be better—like the conscious effort to cultivate something improved, akin to the pluot emerging from the plum—is paramount.