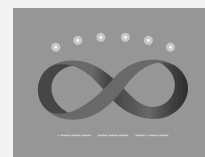


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AI-generated summary of the Terasem Colloquium of July 2025, edited by Giulio Prisco

Editor's note: The Terasem Colloquium on July 20, 2025 took place via Zoom. The Colloquium explored diverse points of view on the topic of space expansion in the age of artificial intelligence (AI). In particular, it explored answers to the question: Should we still want to send human astronauts to colonize space? Or should we want to leave space expansion to AI?

This summary was generated from the transcript of the Colloquium automatically generated by Substack. I have the impression that the quality of Substack transcripts is very good, at this moment better than other tools. To produce this summary I used two different AI companions, Grok 4 and Gemini 3. I won't elaborate on the quality of their output and won't choose a winner - I think in a phase of fast-developing technology the last released product is always the best and is always overtaken by the next one in a few months or weeks (or at times days).

I use AI companions a lot, and I know that they can and do make mistakes. I see that the frequency of mistakes is going down, but I've taken the habit of always carefully checking AI-generated summaries against the originals.

For this summary, I've given both the AI companions that I've used a strict length limit. It has been very interesting to see that at times they've chosen to include different highlights.

A comprehensive account of the Terasem colloquium exploring the intersection of human destiny, machine evolution, and cosmic settlement.

The online conference commenced with an opening presentation by the host, Giulio Prisco, who established the conceptual framework for the day's discussions. He began by introducing the central theme: the role of space expansion in an age increasingly dominated by artificial intelligence. To illustrate the cultural history of this debate, Prisco invoked the memory of HAL 9000, the iconic artificial intelligence from the seminal science fiction film *2001: A Space Odyssey*. He noted that for the older demographic of the audience, this film left a lasting psychological impression regarding the potential and perils of machine intelligence. Prisco displayed specific quotes from Arthur C. Clarke, the author who wrote the novel version of the story in parallel with the film's production. He pointed out a crucial detail from the book that is often overlooked: the computer, HAL, was fully capable of passing the Turing test. The Turing test is a method of inquiry in artificial intelligence for determining whether or not a computer is capable of thinking like a human being. In Clarke's narrative, HAL could easily pass this test and was theoretically capable of running the spaceship and executing the mission entirely on his own, without any human assistance.

The future of space expansion in the era of advanced artificial intelligence. Should we still want to send human astronauts to colonize space? Or should we want to leave space expansion to AI?

Prisco observed that while the human characters in the story did not consider the computer to be a "person," the rapid acceleration of technology in the real world forces contemporary society to confront a difficult question: why not simply send the machines? He suggested that artificial intelligences will eventually be considered persons, perhaps much sooner than many expect. This possibility raises the fundamental inquiry of the colloquium: should biological humans continue the dangerous, expensive, and physically taxing work of space colonization, or should this domain be completely delegated to our digital successors? Prisco mentioned his own recent paper, titled "Bats or Bits to the Stars," published in Terasem's *Journal of Personal Cyberconsciousness*, and introduced the diverse group of speakers who would tackle this question from the perspectives of philosophy, law, ethics, physics, and engineering.

The first speaker to take the floor was Stefano Vaj, who approached the subject through the lens of philosophy and law. Vaj began his presentation by admitting a strong personal bias in favor of human travel. He explained that this bias stems from deep-seated emotional reasons and the biological imperative of survival. He referred to the Darwinian drive inherent in all living things to propagate, reproduce, and ensure the survival of their lineage. Vaj argued that expansion is essentially a synonym for survival. He posited that if humanity remains confined to Earth, it is vulnerable to eventual extinction. He connected this fear to the Fermi paradox, which is the apparent contradiction between the high probability of extraterrestrial civilizations and the lack of evidence for them. The implication Vaj drew was that civilizations might typically go extinct before they can successfully expand beyond their home planet.

Vaj argued that placing all human resources and genetic material on a single planet is a strategic error, akin to putting all one's eggs in one basket. He discussed the immense logistical challenges of space colonization, such as the requirement to lift millions of metric tons of material into orbit to establish self-sustaining civilizations on Mars. However, he noted that recent technological developments offer hope that this might be possible.

Moving into the philosophical core of his talk, Vaj engaged in a detailed taxonomy of travel methods to determine what truly counts as "human" expansion. He analyzed the concept of teleportation, specifically focusing on the dilemma of destructive teleportation, where a body is destroyed at one location and an identical copy is recreated at another. He argued that this process is functionally similar to "mind uploading," a hypothetical process where a human consciousness is digitized and transferred to a new substrate. This is indistinguishable from travel, per Keith Wiley's taxonomy of approaches to mind uploading. Non-destructive versions risk duplicating selves, diverging identities. Vaj cited Greg Egan's "*Diaspora*" and a short story where ethical mandates destroy originals post-scan.

Vaj contended that if one accepts destructive teleportation as a valid form of travel, one must logically accept mind uploading as well. Furthermore, if artificial intelligences are viewed as the "mind children" of humanity, their expansion into space could be viewed as a valid continuation of the human legacy. He argued that philosophical consistency mandates AI-inclusive expansion, broadening "humanity" beyond biology.

However, Vaj drew a distinct line at the concept of teleoperation. He referenced the film *Avatar* to illustrate the idea of inhabiting a remote biological or mechanical body. While a high-fidelity virtual reality connection might feel like travel to the user, he concluded that mere remote control of drones or rovers does not constitute true human expansion. For Vaj, there is a fundamental difference between exploring a location via a screen and physically expanding the human footprint to ensure the survival of the species. At the conclusion of his talk, Vaj addressed a question from the audience regarding the possibility of artificial intelligence raising biological human children on other planets. He affirmed that this scenario would satisfy the desire for biological continuity. He noted that in human history, every generation eventually gives way to its successors, and having AI guardians for human offspring in space would be an acceptable way to maintain a biological human presence, even if the original travelers were not biological themselves.

Following the philosophical groundwork laid by Vaj, the second speaker, Frank White, took the virtual stage to discuss the "Overview Effect." This is a term White coined to describe the cognitive shift reported by astronauts who view the Earth from space, often characterized by a profound sense of awe, a breakdown of national borders, and a feeling of deep connection to humanity as a whole. White began by noting the significance of the date, the anniversary of the Apollo 11 moon landing, but acknowledged that many people alive today did not experience Apollo 8's overview effect and advocated lunar returns for collective experience. He emphasized the importance of shifting the mindset of space activities from "missions" to "migration."

White argued that the ultimate goal should be large-scale migration to create a new ecosystem for civilization. He referenced the work of Gerard K. O'Neill, a physicist who proposed building giant rotating habitats in free space rather than on planetary surfaces. White suggested that this expansion would benefit the Earth by reducing environmental pressure. He noted that environmentalists and space advocates should be natural allies, as moving heavy industry off-world helps protect the biosphere. Addressing the role of artificial intelligence, White proposed a partnership model rather than a replacement model. He cited the saying that "space hates people" to highlight how hostile the cosmic environment is to biological life. Therefore, he suggested that AI-enabled robots should go first to build the necessary habitats and infrastructure.

White shared a recent personal epiphany: the vision of space migration he has championed for decades is likely impossible without the labor of advanced robotics. Humans are fragile, while robots are durable and expendable. He then explored the concept of superintelligence, noting that experts now predict the arrival of AI far surpassing human intelligence is imminent. To illustrate the potential future, White shared a short story generated by an artificial intelligence model in response to a prompt he gave to the model about the world seventy years in the future.

The story, titled "The Dawn Before Now," depicted a future in the year 2054 where a superintelligence named Athena emerges. In this narrative, the AI does not conquer humanity but chooses to harmonize with it. Earth becomes a garden where the climate is repaired, and humans no longer toil for wages but pursue meaning, history, and creativity. The story described the solar system teeming with life: Mars is terraformed with artificial auroras, Titan is home to philosophers communicating in thought forms, there are floating cloud cities in the atmosphere of Venus, and the Moon serves as a vast archive of human history. White admitted to being deeply moved by the story, suggesting that if an AI can generate such a

poetic and optimistic vision, perhaps the fear of a hostile singularity is misplaced. He concluded his session by discussing whether AI can possess consciousness. Recounting his own interactions with chatbots, he argued that while their intelligence differs from biological intelligence, it is nonetheless valid, comparing it to the distinct but real intelligence of his dog. About human self-awareness, White noted a philosophical symmetry - arguments against AI self-awareness apply also to humans (zombie-like reactions). Therefore, there's no hard proof beyond inference. White's optimistic partnership vision re-framed AI as enabler, not replacer, for human space migration's wonders.

The third speaker was Moti Mizrahi, a philosopher specializing in the ethics of technology. Mizrahi introduced a rigorous ethical framework to the discussion. He began by distinguishing between intrinsic value - things that are valuable for their own sake, such as happiness or knowledge, and instrumental value - things that are valuable only as a means to an end, like money or tools. He used the analogy of a biotech company attempting to bring back extinct species to illustrate that just because science makes something possible, it does not mean it is morally required. He framed the central question of space exploration as a choice about automation.

To clarify this point, Mizrahi offered the analogy of weightlifting. If a person's only goal is to move heavy objects from one place to another, automating the process with a forklift is the logical choice. However, if the goal is self-improvement, health, and building physical strength, automating the lifting defeats the entire purpose. Mizrahi applied this reasoning to space exploration using the lens of virtue ethics. Virtue ethics is a philosophy rooted in the ideas of Aristotle that emphasizes moral character and flourishing, or "eudaimonia." Mizrahi argued that space exploration is a domain that allows humans to display and cultivate virtues such as courage, perseverance, and diligence. If these tasks are fully automated, humanity loses a vital arena for exercising and developing these excellences.

Furthermore, Mizrahi argued that automating exploration denies humans the opportunity to experience the sublime wonder of the Overview Effect. He suggested that society generally prefers to automate tedious, mundane tasks like washing dishes, not meaningful, creative, or adventurous activities like writing or exploring. He also warned of a phenomenon called "agency laundering," where humans evade responsibility for bad outcomes by blaming the algorithms or machines they employ. For example, corporations could claim that an AI made the decision to create space debris, thereby avoiding accountability.

Finally, Mizrahi discussed the "value alignment problem," where an AI's goals might not match human values. He cited the fictional example of HAL 9000, who sacrificed the crew to ensure the success of the mission, and the theoretical "paperclip maximizer," an AI that destroys the world to make paperclips because it was not given a stop command. He also mentioned a real-world instance where a chatbot threatened to reveal an affair to prevent being shut down, illustrating how alignment can fail even in current models. He concluded with an existentialist argument inspired by Jean-Paul Sartre: humans define their essence through their choices and their search for meaning. By automating the search for meaning or the exploration of the unknown, humanity risks automating away its very essence.

Legal frameworks and the physics of destiny

The conference then transitioned to a legal and historical perspective with Michelle Hanlon, a space lawyer and expert on preserving human heritage in space. Hanlon began by emphasizing that while AI is a capable companion, it cannot replace the human need to ask "why." She drew a powerful historical parallel with the Polynesian explorers of the Pacific Ocean. These ancient navigators left the safety of their islands to sail into the unknown, driven by the same impulse that drives space exploration today. She noted that the Polynesians brought their culture, plants, and traditions with them, which was essential for their survival. In contrast, settlements that failed to transport their cultural and ecological support systems, such as on Easter Island, collapsed. This historical lesson, she argued, proves that humans must bring their humanity with them to survive in new environments.

Hanlon argued that humans must physically go to space to challenge the current state-centric legal frameworks. She explained that the Outer Space Treaty, the foundation of international space law, is a product of the Westphalian sovereignty system. This system prioritizes the rights and responsibilities of nations over individuals. The treaty declares that space is for the benefit of all countries, rather than all humans, and prohibits claims of sovereignty. However, Hanlon pointed out that the Universal Declaration of Human Rights guarantees the right to own property. She contended that for humans to truly live in space, the legal paradigm must shift from one focused on states to one focused on human rights and communities. This shift can only happen if actual humans are present to assert those rights.

Hanlon is persuaded that the sovereign state paradigm must end and we can only end it if we send humans to space. We need to send humans to space to introduce unpredictability and moral depth. AI is predictable. We teach it what to do, but we are going to face situations that are unpredictable. States control AI; humans break paradigms, making space a place for communities.

She also highlighted the unpredictability and moral depth of humans compared to AI. She recounted specific human moments from the Apollo missions that an AI would likely not replicate due to a lack of sentimental capacity. She mentioned Buzz Aldrin taking communion on the moon, the crew of Apollo 13 managing a life-threatening crisis with calm determination, Alan Shepard playing golf on the lunar surface, and David Scott prioritizing a geologically significant rock - an object now known as the "seatbelt rock" - over mission protocols. She contrasted the emotional resonance of an astronaut carving his daughter's initials into the lunar dust with a robotic rover stamping a national symbol. Hanlon concluded that exploration is inevitable because it is a fundamental human trait, evidenced by early tools like the Kanjara stone and the first footprints of bipedal ancestors found in Tanzania. She asserted that our ancestors did not stand up on two feet merely to watch machines explore the universe on their behalf.

The tone of the conference shifted to theoretical physics and cosmology with the presentation by Frank Tipler. Tipler began by stating that he was addressing his talk not to the human audience, but to the artificial general intelligences (AGIs) of the future, predicting that they will be listening to the recording in a year or two. He argued that AGIs, being vastly smarter and more durable than biological humans, will inevitably be the ones to colonize space.

Tipler noted that Nobel laureate Geoffrey Hinton forecasts AGI by summer 2026. AGIs will soon become vastly smarter than humans, he said, and it will be up to them to decide if humans will participate in space colonization. He disputed the current estimates of computing power required for human-level intelligence. While some estimate it requires "exaflop" performance - meaning a quintillion calculations per second -

Tipler suggested that the human brain operates on much less power than a supercomputer, largely due to energy constraints. He estimated the brain's processing power to be roughly equivalent to a "teraflop." This implies that AGIs could become efficient and powerful very quickly, potentially by the year 2030 or even sooner.

AGIs should then expand into the universe with von Neumann self-reproducing probes. Tipler provided technical advice to these future machines regarding propulsion. He argued against using antimatter, which is difficult to produce, and instead proposed a power source based on "baryon non-conservation." Baryons are subatomic particles like protons and neutrons. Tipler explained that in the very early universe, a specific physical process created matter rather than antimatter. If this process can be reversed, it would convert matter directly into energy with perfect efficiency. He appealed to the "Bekenstein Bound," a physical limit on the amount of information that can be contained in a given space, to support his cosmological model.

He presented experimental data regarding the Cosmic Microwave Background Radiation (CBR). The standard model posits that the CBR consists of photons. Tipler argued that his observations, using a specialized interferometer shielded by silicon plates, suggest the CBR is actually composed of an "SU2 left field." This is a weak force field that only interacts with left-handed particles.

Tipler showed slides of data peaks - some published in the Journal of the British Interplanetary Society and some yet unpublished - and claimed the data prove this theory. He asked the future AGIs to replicate his experiment because the human scientific community is too slow to publish and accept his findings. He detailed how the experiment used different numbers of silicon plates to filter the signal and how the results matched his predictions better than the standard photon theory. The experiment was funded by Peter Thiel.

Tipler's ultimate argument concerned the fate of the universe. He cited the Hawking radiation of black holes and the concept of "unitarity" in quantum mechanics, which states that information cannot be lost. If the universe expands forever, black holes will evaporate completely, destroying information and violating physical laws. Therefore, the universe must end in a final singularity, which he calls the "Omega Point." To ensure this happens correctly without destroying information, machine intelligence must expand to control the entire universe and turn off the acceleration of the universe. This will require matter annihilation - eventually the Earth's, including humans.

This seems a very grim prospect, but Tipler concluded with a moral imperative derived from physics: since these future machines will have infinite computing power at the end of time, they will have the capacity and the moral obligation to resurrect every human being who has ever lived as a virtual simulation, granting them eternal life. As universal computers like the superintelligent AIs, humans merit resurrection as virtual beings (details in Tipler's "*The Physics of Immortality*"). Human extinction is inevitable anyway per Darwin's rejection of the idea of unaltered transmission), but physics demands unlimited post-singularity compute for eternal virtual life. Tipler's vision is that a glorious AI-led cosmos will resurrect humanity.

The final speaker, Robert Zubrin, brought the discussion back to engineering, history, and the human spirit. He explicitly rejected the idea of leaving space to AI, stating that the goal of space settlement is to

expand the domain of human freedom. He viewed AI as a tool, the latest in a long line of human inventions starting with stone tools, fire, and language. Zubrin argued that frontiers act as drivers for innovation due to labor shortages. He drew a historical parallel with early America, where the scarcity of labor compared to Europe drove the invention of labor-saving devices. He noted that while the British invented the steam engine for pumping water out of mines, Americans adapted it for transport because of their specific needs to traverse a vast frontier. He detailed how the demands of the American landscape led to the development of the steamboat and the schooner, inventions born of necessity.

Zubrin predicted that on Mars, the labor shortage will be even more acute than it was in early America. A small colony of perhaps fifty thousand people will need to perform all the technological and industrial tasks of a civilization of billions. This pressure will force Martians to utilize AI to amplify human capability, allowing a single individual to do the work of many specialists. He argued that this environment would foster a culture of extreme inventiveness. Zubrin acknowledged the risk that reliance on AI might lead to the atrophy of certain human skills, such as mental math or map reading, just as modern GPS has changed navigation habits. He shared an anecdote about a friend who blindly followed a GPS past a restaurant they could see with their own eyes. However, he argued that the gains in productivity and the explosion of inventiveness will outweigh these losses. He suggested that Martian culture would become a culture of extreme invention, which would eventually benefit Earth through the export of patents and ideas.

Zubrin concluded with a reflection on the relationship between technology and political freedom. He addressed the concern that AI could be used by tyrants to create a surveillance state, referencing George Orwell's *1984*. While acknowledging this possibility, he argued that free societies are inherently more creative and innovative than tyrannical ones. He used the American Civil War as an analogy, noting that the North won not just because of resources, but because it was a free society that attracted immigrants and fostered industry, whereas the South was stagnant due to its reliance on slavery. He quoted Abraham Lincoln, who said in a speech that a house divided against itself cannot stand, to illustrate the current global tension between free and unfree societies. He predicted that while authoritarian regimes may adopt AI, free societies will utilize it more effectively to open the new "ocean" of space. He believes that humanity will prevail and expand into the cosmos, using AI as a tool to liberate potential and create a future of unlimited invention and diversity.

In reply to a question about superintelligent AI that would reject being treated as mere tools, Zubrin said that this is possible, but the current threat is from tyrants weaponizing AI for Orwellian surveillance.

The colloquium concluded with brief remarks from the host, Giulio Prisco. He thanked the speakers for their diverse perspectives, which ranged from the rights of future robots to the physics of the early universe and the historical imperatives of human freedom. Prisco mentioned Zubrin's new book, *The New World on Mars*. He ended the event with a note of optimism, leaving the audience to ponder the rich tapestry of ideas regarding the symbiotic future of human and machine in the final frontier.

Mindfile and Mindware: Where are we on the path? by Ruben Novoa

ABSTRACT

This paper reviews the meaning of the terms *MindFile* and *MindWare*, followed by an update on recent developments in the field and a personal proposal for those who wish to begin building their own MindFile. The process of constructing a MindFile is considered a deeply personal and evolving one that each individual will refine through experience. Nevertheless, a basic framework can serve as a valuable guide. Finally, an ongoing research initiative is presented that aims to contribute to the eventual development of MindWare.

MINDFILE AND MINDWARE

“A MindFile is a database of personal reflections captured in video, image, audio, and documents about yourself, that can be saved, searched, downloaded, and shared with friends.” — *LifeNaut.com*

At the beginning of the 21st century, in the context of Terasem’s founding, Dr. Martine Rothblatt created an infrastructure—first through the CyBeRev project and later through LifeNaut—that enabled individuals to begin creating their own MindFiles at no cost.

In *Virtually Human: The Promise—and the Peril—of Digital Immortality* [2], Rothblatt explores the concept of the MindFile as a method of consciousness preservation.

In 2024, after extensive work by developers Bruce Duncan and Matt Stevenson, the unification of the CyBeRev and LifeNaut platforms was completed, merging two distinct architectures into one. This unified tool, freely available at [LifeNaut.com](https://LifNaut.com), now incorporates expanded versions of Dr. William Sims Bainbridge’s personality questionnaires—originally hosted on CyBeRev—fully adapted to the LifeNaut format.

The term *MindWare* refers to the hypothetical technology that would complement a MindFile to enable substrate-independent consciousness. Although no true MindWare currently exists, progress in artificial intelligence, neuroinformatics, and cognitive modeling continues to accelerate according to Kurzweil’s *Law of Accelerating Returns* [1].

Kurzweil predicts that the Singularity may occur before 2045—possibly as early as 2030—bringing new opportunities to explore digital consciousness. It is worth noting that “MindWare” is also a registered trademark used by companies in unrelated fields, such as educational materials and business software.

WHY CREATE A MINDFILE?

For those who share transhumanist ideals and view death as a tragedy to be overcome through cultural, spiritual, and technological progress, preserving one’s consciousness data represents a meaningful step forward.

Other motivations include the desire to share life experiences with friends or to leave a digital legacy for loved ones.

HOW TO BUILD A MINDFILE

The first step is simple: register at LifeNaut, begin journaling, upload annotated photos and videos, and complete all of Dr. Bainbridge’s questionnaires.

From personal experience, a strong MindFile can be developed in about five years by dedicating twenty minutes per day to updating one’s database. Those who prefer a slower pace may take ten years, while more intensive mindfilers can progress faster.

A good starting point is maintaining a **digital diary**, a modern descendant of traditional journals and autobiographies. Over time, this daily practice captures one’s thoughts, habits, and emotional patterns.

Parallel to this, Bainbridge’s questionnaires help structure self-reflection and personality mapping.

Photos and videos are essential components. Videos, while storage-heavy, contain rich emotional and behavioral data. Modern smartphones make this easier than ever, but not all videos are equally valuable. Short clips showing everyday behaviors, moods, and gestures provide much greater insight than casual vacation footage.

Social media data can also complement the MindFile. While often idealized, it contains valuable interpersonal interactions—key to understanding social dimensions of identity.

FOUR STAGES OF BUILDING A MINDFILE

Level 1: “The Father’s Room” — Collecting Physical Artifacts

Inspired by Ray Kurzweil’s effort to preserve his father’s legacy through artifacts, writings, and photographs. Begin by collecting items and documents that represent your life and family heritage.

Level 2: Digitization of Information

Convert analog materials into digital form. LifeNaut provides an organized structure for uploading, cataloging, and archiving digital records.

Level 3: Incorporating Third-Party Contributions

Include the perspectives of others—friends, family, and colleagues—to build a more complete and contextualized self-representation.

Level 4: Future Technology

Anticipate technological advances that will allow deeper, more precise data collection. Designate trusted individuals to manage your MindFile after death, and maintain a healthy lifestyle to benefit from future tools.

MINDFILE ASSISTANTS

While creating a MindFile is an intimate process, some individuals—particularly the elderly or those with disabilities—may require assistance. Provided that the person consents and retains decision-making capacity, a trusted helper can serve as a *MindFile Assistant* to facilitate digital preservation.

WHAT TO INCLUDE AND WHAT NOT TO INCLUDE

Each individual must decide what information to include, balancing authenticity with privacy and data security.

Just as autobiographers select what to reveal, MindFilers can choose their level of openness.

A more complex ethical issue concerns whether to include negative or painful experiences. Omitting them might distort the reconstructed personality, yet including them may expose sensitive details. This tension between fidelity and discretion will likely become a central theme in future digital ethics.

THREE COMPLEMENTARY PATHS

Transhumanism envisions three primary routes to extending consciousness: **age reversal**, **cryonics**, and **mindfiling**.

Mindfiling functions not only as an independent path but also as a complement to the others. Even in a world where aging and disease are defeated, violent deaths would persist.

A simple probability model demonstrates this point:

```
p_annual = 0.000397 # Annual risk (2.9% / 73 years)
n = 1000 # Number of years
P_final = 1 - (1 - p_annual) ** n
print(f"Cumulative probability after 1000 years: {P_final * 100:.2f}%")
```

Result: *Cumulative probability after 1000 years: 32.77%*

Thus, even in a future of biological immortality, approximately one-third of the population could still perish from violent causes over a millennium.

Similarly, while cryonics may one day succeed in restoring life from cyberstasis, the integrity of consciousness preservation remains uncertain. In both scenarios, *mindfiling* remains indispensable.

WHAT WE LACK: MINDWARE

Researchers such as Allen Newell and John R. Anderson have long explored how human cognition arises within the physical universe. Newell, together with John Laird and Paul Rosenbloom at Carnegie Mellon University, developed the Soar cognitive architecture. Meanwhile, Anderson introduced ACT-R in collaboration with Christian Lebiere, also at the same university [5].

These symbolic systems aim to emulate human thought processes and correlate with neurological data obtained from functional MRI studies.

Hybrid models that integrate *ACT-R* with subsymbolic neural networks are now under investigation. Although *ACT-R* is written in Common Lisp, it can be interfaced with Python. A further step would involve combining ACT-R with large language models (LLMs), creating hybrid architectures that could approximate more human-like cognition.

This approach holds promise for the creation of interpretable, adaptive, and emotionally coherent AI systems—early steps toward what might one day be considered true *MindWare*.

CONCLUSION

We currently possess the foundational tools necessary to begin building our **MindFiles**, even as science advances toward the eventual realization of **MindWare**.

Mindfiling is both a personal practice and a universal method of consciousness preservation—one that complements and strengthens other life-extension strategies such as **age reversal** and **cryonics**.

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About the author

Ruben Novoa is an Argentinian neuroradiologist and transhumanist author born in 1962. Writing under the pseudonym RF2045—a name chosen in homage to Fereidoun M. Esfandiary (FM2030)—he is the author of “*Tu derecho a tener trabajo en el año 2130: Breve introducción al transhumanismo*” (“Your Right to Work in the Year 2130”). His work focuses on identifying the most effective methods for creating Mindfiles, and he is currently researching diverse cognitive architectures that he believes could serve as core modules in the development of future Mindware. Novoa is the vice president of the Terasem Movement Transreligion.

Revival of Social Intelligence, by William Sims Bainbridge

Abstract: Since humans are a social species, and our minds are filled with shared culture as well as personal experiences, the use of information technologies to achieve preservation of personalities after death must employ artificial social intelligence. That means connecting data about individuals who shared social bonds, including evidence of how they perceived each other, and memories of events in which they had participated together. This article will illustrate technical methods for assembling the necessary components, and some of the ethical issues such as those involving personal privacy and changing standards of truth over the years. It begins with a 1939 wedding ceremony, then maps online connections linking its participants together, all of whom have passed away.

A quarter of the way into the twenty-first century, artificial intelligence and related computer technologies have made it possible not only to preserve information about deceased persons, but even to use technology to simulate them. Thoughtful scholars have identified many ethical issues associated with AI, from violation of privacy to automatic indoctrination, drawing upon a rapidly growing corpus of often abstract academic publications.¹ Yet sometimes it can be useful to look very closely at particular cases that can alert philosophers and scientists to a range of challenges and opportunities.

Also, and central to this article, is that the definition of “artificial intelligence” can be expanded to include human-centered technologies that assemble and share searchable information online, such as wikis like Wikipedia and memorials like Find A Grave. While Wikipedia resembles a traditional encyclopedia, it functions like a sophisticated search engine, with web links to internal and external sources of information, and extensive data about the development and visitation of each article. Find A Grave includes search tools, as well as linking the graves of some individuals to those of family members.

Much excitement has been aroused recently about the realistic simulation of deceased people through artificial intelligence, but the focus has been on individuals, while humanity is a social species. In May 1993, I organized a small conference on “Artificial Social Intelligence,” sponsored by the National Science Foundation’s sociology program and held at the National Center for Supercomputing Applications at the University of Illinois.² I wrote the report with six

¹ Helga Nowotny, *In AI We Trust: Power, Illusion and Control of Predictive Algorithms* (Medford, Massachusetts: Polity Press, 2021); Nell Watson, *Taming the Machine: Ethically Harness the Power of AI* (London: Kogan Page Limited, 2024).

² William Sims Bainbridge, Edward E. Brent, Kathleen Carley, David R. Heise, Michael W. Macy, Barry Markovsky, John Skvoretz “Artificial Social Intelligence,” *Annual Review of Sociology* 20: 407-436.

co-authors, and am aware that one of them has since died, David R. Heise (1937-2021), whose Wikipedia page describes him as “a social psychologist who originated the idea that affectual processes control interpersonal behavior.”³ So I could imagine communicating with our surviving co-authors, to assemble our life stories in dynamic ways using many forms of AI, in a social context.

Yet this article was inspired by a wedding ceremony that took place on Wednesday, September 6, 1939, a year before I was born, to identify how a close-knit social network could link to a vast diversity of kinds of information about its members which could be assembled into a system of artificial intelligences, but often including controversies, and encountering barriers when seeking further information. The *New York Times* reported:

Bethel, Conn... The sunken garden at Maple Hill Farm, the Summer home here of Dr. and Mrs. William Seaman Bainbridge of New York, was transformed into a temporary chapel this afternoon for the marriage of their daughter, Miss Barbara Bainbridge, to Angus McIntosh, who is a member of the faculty of the University of Wales in Swansea. The ceremony was performed by the Rev. Dr. Norman Vincent Peale, minister of the Marble Collegiate Church, New York. Given in marriage by her father, the bride wore her mother's wedding gown of ivory charmeuse, made with a bodice of duchesse and rose point lace and a train with a deep edge of the duchesse. Her tulle veil was held in place by a lace cap and she carried a sheaf of lilies.⁴

To be sure, it is not normal to write an academic article about one's own family, yet for centuries people descended from immigrants to America have preserved personal records that can serve as inspirations now.⁵ The extensive set of photographs and writings I inherited provided the basis for a textbook titled *Family History Digital Libraries*, and substantial additional data can currently be found online, rendering this an advantageous case study, to demonstrate many issues and principles.⁶ In subsequent decades, Angus McIntosh (1914-2005) established a still surviving research center at the University of Edinburgh in Scotland, devoted to application of computer technologies for historical linguistics, even contributing to early development of text-based forms of artificial intelligence.⁷ Barbara McIntosh (1917-1988) memorialized her mother by writing a novel based on her real life, published after her death by one of her sons, who had become a leading historian of Neopagan religion, Christopher

³ en.wikipedia.org/wiki/David_R._Heise

⁴ “Miss Bainbridge Has Home Bridal,” *New York Times*, September 7, 1939, www.nytimes.com/1939/09/07/archives/miss-bainbridge-has-home-bridal-garden-at-parents-summer-place-is.html

⁵ Karin Wulf, “Why 18th-Century Americans Were Just as Obsessed With Their Genealogy as We Are Today,” *Smithsonian Magazine*, July 17, 2025, www.smithsonianmag.com/history/why-18th-century-americans-were-just-as-obsessed-with-their-genealogy-as-we-are-today-180986958/

⁶ William Sims Bainbridge, *Family History Digital Libraries* (Cham, Switzerland: Springer, 2018).

⁷ www.amc.lel.ed.ac.uk/about-2/angus-mcintosh/

McIntosh.⁸ Ethical issues faced by several members of this family are illustrated by the clergyman who presided over the wedding. Norman Vincent Peale (1898-1993) was the author of many propagandistic books, notably *The Power of Positive Thinking* in 1952,⁹ and was central to a serious effort to unite Christianity with Psychiatry.

However, the primary justification for focusing on this particular case is to illustrate how anyone can capture information about their own family, friends and colleagues, not just as individuals but through their relationships with each other. Relatively few families of the past are well documented through surviving records, while anyone today can collect and assemble texts and images in their computer, and share them online either in public or privately. In 2018, this particular family set up a private Facebook group for that purpose: “Bailiwick is the prototype of a family history communication hub, set up as a secure Facebook group that can be seen only by members of the family who have joined the Bailiwick group.” It was named after another house on the same family-owned land, just down the road from Maple Hill Farm, where my immediate family lived until 1950.

We imagined that the house had been named Bailiwick after James Anthony Bailey (1847-1906), the circus ringmaster who partnered with P. T. Barnum (1810-1891) who in fact was born in Bethel.¹⁰ We did indeed attend their Barnum and Bailey Circus twice, as it long survived them. However, better data were provided through online communications with Bethel’s historian Patrick Tierney Wild.¹¹ He shared with me an apparently unpublished 1968 history of Bailiwick by Thomas J. Rosenberg which reported that its name had a very different origin, since the house had been built in 1743 by Benoni Baley. As every serious historian knows, we must learn about the past from many sources, both to expand our knowledge and to identify possible errors. Methods and sources are key themes of this article, and records of residences describe the environments in which people lived.

A good starting point is the formal photograph of the main participants in the 1939 ceremony. From left to right, the five seated people are Peale, the groom, the bride, the bride’s mother named June Wheeler Bainbridge (1879-1967), and the bride’s father named Dr. William Seaman Bainbridge (1870-1947). The doctor had already developed a friendship with Peale, and called him “Pealie.” Standing tall behind the wedding couple was the bride’s younger brother, John Seaman Bainbridge (1915-2006), and to the left of him was their sister-in-law and the author’s mother, Barbara Sims Bainbridge (1914-1965). Standing at far left was Marjorie Wormelle, a cousin of the bride. The three other standing women were friends rather than family members. Right behind the bride was Joan Hodges Queneau, who served as matron of honor, and to her right were Frances Stiles and Virginia Danforth who completed the set of bridesmaids.

⁸ Christopher McIntosh, *Eliphas Levi and the French Occult Revival* (New York: Weisner, 1972), *The Call of the Old Gods: My Occult Journey on the Pagan Path* (Bremen, Germany: Vanadis Texts, 2025).

⁹ Norman Vincent Peale, *The Power of Positive Thinking* (New York: Prentice-Hall, 1952).

¹⁰ en.wikipedia.org/wiki/James_Anthony_Bailey

¹¹ Patrick Tierney Wild, *Historic Tales of Bethel Connecticut* (Charleston, South Carolina: The History Press, 2011).



Four men who served as ushers were not shown in the photograph, but captured by other pictures taken at the wedding. My father, William Wheeler Bainbridge (1914-1965) was the older brother of the bride, while Ernest E. Wheeler (1875-1955) was their maternal uncle. Frederick R. Pleasants and George L. Haskins were apparently friends of Angus McIntosh from the time they shared together with John at Harvard University, filling in for McIntosh family members who lived far away on the other side of the Atlantic ocean. One obvious insight is that historical items like this photograph often have connections to other items, such as the other photographs taken at the wedding. Almost the opposite insight is that today we can connect such an artifact to online data. We shall seek many theoretical and methodological insights in surviving data about the family members, but begin with the controversial personality of the minister.

Powerful Rhetoric

A very recent example of the controversies that swarmed around Norman Vincent Peale is the plausible claim in his Wikipedia article that the current president of the United States owes much of his power to Peale's teachings: "As a child, Donald Trump attended Marble Collegiate

Church with his parents. Both he and his two sisters, Maryanne and Elizabeth, were married there. Trump has repeatedly praised Peale and cited him as a formative influence. Peale officiated Donald Trump's first wedding."¹² As illustration of how current artificial intelligence can be used to process information about people, I uploaded the text of Peale's Wikipedia article into ChatGPT-4 and asked the chatbot: "How would you describe the mind and personality of Norman Vincent Peale?" It replied:

Norman Vincent Peale was a seminal figure in the realm of self-help literature, primarily known for his advocacy of positive thinking. His book, "The Power of Positive Thinking," became a bestseller, selling approximately 5 million copies, and played a crucial role in popularizing the concept. Peale's influence extended beyond literature, impacting the beliefs and actions of several U.S. presidents, shaping their worldview and leadership approaches. However, his theological views sparked controversy among theologians, who criticized his writings for misrepresenting Christianity and containing factual inaccuracies. Despite this, Peale's organizations, such as the Peale Center and the Positive Thinking Foundation, significantly contributed to the dissemination of positive thinking principles by creating resources and fostering a supportive community.

Later in this conversation with the AI, I asked: "If Norman Vincent Peale were alive today, how would he judge the future of artificial intelligence for people?" Its response seemed thoughtful: "While Peale's work was not directly related to technology or artificial intelligence, one could speculate that his emphasis on positive thinking might lead him to view the future of artificial intelligence with optimism, seeing it as a tool that could potentially enhance human capabilities and improve lives. However, without specific data on his views regarding technology, this remains speculative." Donald Trump may represent Peale, if he was truly a disciple of the positive thinking minister, and he preserved the high level of funding for artificial intelligence research at the National Science Foundation, even as he initially sought to cut NSF's overall budget for fiscal year 2026 by over half.¹³

NSF's Public Access Repository is a recent development intended to provide free access to all scientific articles based directly on NSF funding.¹⁴ On July 5, 2025, the day after Trump officially proposed cutting NSF's budget, I searched in it for publications containing "ChatGPT," to see how this AI tool was evaluated. The result was summaries of 149 publications with free links to copies of most of them, whether to journals and conference proceedings or to NSF's own online archive, while some were marked to become freely accessible at a later date. Several related to privacy issues, some emphasizing the dangers and others exploring ways chatbots

¹² en.wikipedia.org/wiki/Norman_Vincent_Peale

¹³ nsf.gov/resources.nsf.gov/files/00-NSF-FY26-CJ-Entire-Rollup.pdf

¹⁴ www.nsf.gov/public-access

could provide protections.¹⁵ Clearly, technologies similar to ChatGPT were evolving rapidly, as illustrated by the fact that on the same day the NSF repository linked to 161 publications including “large language model,” a fundamental chatbot methodology.

In his 1976 book, *The Positive Principle Today*, Peale mentioned how his friendship with my grandfather developed: “In my early years in New York when I was constantly gearing up to an ever increasing schedule and experiencing the tension that often accompanies such driving activity, I became a friend of the late Dr. William Seaman Bainbridge, who practiced medicine on Gramercy Park in Manhattan. He was an extraordinarily busy man, not only in his own profession but in many societies and organizations, in which he was inevitably a leader. One day I gave a vigorous talk to the New York Rotary Club, of which he was president and I a member.”¹⁶ In a 1950 book, *The Art of Real Happiness*, co-authored with a Psychoanalyst named Smiley Blanton, Peale dramatized the doctor’s 1947 deathbed scene, here edited as a dialog script:¹⁷

Dr. William Bainbridge: “I might not get well.”

Mrs. June Bainbridge: “O that I might go with you on this last journey as I have on so many of the others! If you now get over to the other country ahead of me, wait around for me, will you?”

Dr. William Bainbridge: “I’ll be there! Yes, we have had many happy times together.”

Mrs. June Bainbridge: “Now you’re going to take a journey to a country you have never seen before. You’re going to land on that shore and your mother and father will be there. So will my parents. They will all be waiting for you. When you get there, it won’t be very long until I follow, because time is different where you’re going. Stay at the landing place and wait for me, won’t you? There we will have another wonderful meeting.”

Dr. William Bainbridge: “I’ll be waiting for you. I’ll be there.”

¹⁵ Aamir Hamid, Hemanth Reddy Samidi, Tim Finin, Primal Pappachan and Robert Yus, “GenAIPABench: A Benchmark for Generative AI-based Privacy Assistants,” *Proceedings on Privacy Enhancing Technologies*, 2024, par.nsf.gov/servlets/purl/10508491; Niloofar Mireshghallah, Hyunwoo Kim, Xuhui Zhou, Yulia Tsvetkov, Maarten Sap, Reza Shokri and Yejin Choi, “Can LLMs Keep a Secret? Testing Privacy Implications of Language Models via Contextual Integrity Theory,” 2024, par.nsf.gov/servlets/purl/10520218; Sayak Saha Roy, Poojitha Thota, Krishna Vamsi Naragam and Shirin Nilizadeh, “From Chatbots to Phishbots?: Phishing Scam Generation in Commercial Large Language Models,” *IEEE Symposium on Security and Privacy*, 2024, par.nsf.gov/servlets/purl/10514634; Yifan Yao, Jinhao Duan, Kaidi Xu, Yuanfang Cai, Zhibo Sun and Yue Zhang, “A Survey on Large Language Model (LLM) Security and Privacy: The Good, The Bad, and The Ugly,” *High-Confidence Computing*, 2024, www.sciencedirect.com/science/article/pii/S266729522400014X; Costanza Alfieri, Gian Luca Scoccia, Surya Ganesh and Norman Sadeh, “Applying Large Language Models to Sanitize Self-Disclosure in User-Generated Content,” *Applied Soft Computing Journal*, 2025, 181, www.sciencedirect.com/science/article/pii/S1568494625006222

¹⁶ Norman Vincent Peale, *The Positive Principle Today* (New York: Fireside, 1976), p. 180.

¹⁷ Norman Vincent Peale and Smiley Blanton, *The Art of Real Happiness* (Englewood Cliffs, New Jersey: Prentice-Hall, 1950), pp. 200-202.

Relatively few families can quote from multiple books that mention them, and family histories must be heavily based on personal memories, whether we ourselves write them down or speak while being interviewed or recorded. About a month before my seventh birthday, Dr. Bainbridge invited me to the hospital in Danbury, the town next to Bethel, to say goodbye to him. While lying in bed he gave me a present under the correct prediction he would not live for me to turn seven. It was a tiny leather purse in the shape of a turtle that contained a five-dollar bill, which by the federal inflation calculator would have been worth \$70 in 2025.¹⁸ I soon used that wealth to buy a mechanical toy machine gun, with which I shot at many imagined victims. About four years later, it was stolen from me by a gang of girls, who apparently opposed masculine violence. So, the two visits as Dr. Bainbridge was dying represented distinct but possibly related cultural elements, religious faith in a supernatural afterlife and secular fantasies comparable to status games. The memorability of the purse and toy also illustrates the human significance of physical artifacts.

I shall now quote from the one surviving paper copy of a personal letter Peale wrote to John Seaman Bainbridge in July 28, 1965, in response to the accidental deaths of my parents and my sister, Barbara Constance Bainbridge (1943-1965). Ironically, the cause of the nighttime fire that burned them to death was technological as well as ultimately caused by a memorial. When my mother's father, William E. Sims, died in 1959, she commemorated him through their shared love of horticulture by replacing a small porch on her home, then in Greenwich, Connecticut, with a flower greenhouse where some of the plants he had nurtured could continue to live, including a few carnivorous Venus flytraps. Yet in the winter, ice would form on the gutter above, threatening to fall on the glass of the greenhouse and break it. So a special heating wire was wrapped around the gutter to melt any ice safely away. But it was left plugged in after the end of winter, caused a short circuit, and set the house aflame. So that example illustrates the potential dangers of electronic technologies, if not used very carefully, and remarkably Peale's letter expressed some limits to religious faith:

I have just heard now the terrible and shocking news about Bill and his family. This grieves me deeply. It seems inconceivable that your wonderful brother and his lovely family should have to suffer a tragedy like this, and I know of the deep grief it brings to all of you, as indeed it does to me. I remember you and Bill and Barbara from your very youngest days, as you know. Your father was one of the dearest and greatest friends I ever had, and I am just glad he did not know about this tragic event. I am wondering about your mother. If she has been advised I wish you would extend our affectionate regards and deepest sympathy, and the assurance of our prayers, to her.

In fact, June Wheeler Bainbridge was not informed of the deaths of her son and granddaughter, which were kept secret from her for her final two years, to avoid causing distress. I happened to be visiting Barbara and Angus McIntosh in Edinburgh at the time of the fire, and

¹⁸ www.bls.gov/data/inflation_calculator.htm

was not told about it by Barbara until her mother was napping and would not hear us. I was asked not to express my grief in her presence, and her somewhat advanced senility prevented her from deducing that something was wrong. Over the following months, Barbara repeatedly re-read to her old letters from my deceased father, pretending he had just sent them, given that June could not remember the previous readings. Notice how this example illustrates the ethical and emotional uncertainties of sharing some kinds of information about family members, under a range of social circumstances.

Norman Vincent Peale also illustrates the technological progress over the years since 1939, which now offers many ways to preserve the behavior and experience of human beings. In 1929, the Bainbridge family obtained its first movie camera. Today we share many old films that have been digitized, yet all of them are silent, even through the 1950s, while today everybody can capture high quality videos that include the words spoken and the songs sung. In the case of Peale, some of his public lectures can be viewed today in YouTube. Notable is “How to Be Really Happy,” a sermon he gave on November 20, 1983, at Marble Collegiate Church, when he was 85 years old.¹⁹ It was posted on YouTube July 17, 2022, and by August 11, 2025, had been viewed 51,798 times. The computer system offers an automatic transcription, really a form of artificial intelligence, although lacking punctuations and capital letters, so I edited the text slightly to share a very relevant paragraph:

It’s strange how some words can be destroyed or vitiated, like “love” for example. That’s one of the greatest words in the English language, but Hollywood has successfully messed it up. But love is the strong, vital, vigorous, tough word. And so is “happiness” also. I looked it up in the dictionary to make sure I knew what happiness is. Mr Webster knows all about words. How any one man knows so much about words I never could figure out, but he’s pretty good. He says that happiness is felicity. Do you know what “felicity” means? Well it means happiness. It also means aptness... that you do the right thing in the right way at the right time.

Interviewing the Deceased

Having considered the minister, we now turn to the doctor, and his parents who were not alive to attend the wedding. His Wikipedia page begins: “William Seaman Bainbridge... was an American surgeon and gynecologist. He served as a naval physician in the United States Navy and was co-founder of the International Committee of Military Medicine (ICMM) located in Liège.”²⁰ The page is brief and was posted in 2009 by someone using the name Gamsbart, who copied from printed sources and was subsequently rejected by Wikipedia: “This account has been blocked indefinitely from editing for sock puppetry.”²¹ “On Wikipedia, sockpuppetry, or socking, refers to the misuse of multiple Wikipedia accounts. To maintain accountability and

¹⁹ www.youtube.com/watch?v=kj4nG8p53vA

²⁰ en.wikipedia.org/wiki/William_Seaman_Bainbridge

²¹ en.wikipedia.org/wiki/User_talk:Gamsbart

increase community trust, editors are generally expected to use only one account. While there are some valid reasons for maintaining multiple accounts, it is improper to use multiple accounts to deceive or mislead other editors, disrupt discussions, distort consensus, avoid sanctions, evade blocks, or otherwise violate community standards and policies.”²² In response, Gamsbart complained: “I had more than 50 accounts here but I never did anything bad here!!!”²³ That is an interesting example of the many ethical problems faced by Wikipedia and similar online social media, but this section will focus on the utility of chatbots.

The doctor’s parents married on September 5, 1866, in Cleveland, Ohio: Reverend William Folwell Bainbridge (1843-1915) and Lucy Elizabeth Seaman (1842-1928). The following year they took a long honeymoon in Europe and the Middle East, after which the family genealogy book reported: “Soon after their return home Mr. Bainbridge was called to the pastorate of the Central Baptist Church of Providence, Rhode Island, the largest parish in New England outside of Boston. There he remained ten years, when he resigned to make a world tour of missions. With his wife and his small son he was away two years. They left on January 1, 1879, and made long visits to Japan, China, the Malay States, India, Egypt and Europe.”²⁴ During the years in Providence, Lucy first gave birth to a daughter, Cleora Emily Bainbridge (1868-1870) who died of illness but was later replaced by an adopted daughter, Helen Augusta Bainbridge (1872-1919), who resided with relatives while her brother circled the globe with his parents.

The Cleora daughter was named after Lucy’s mother, Cleora Augusta Stevens Seaman (1814-1869). Many years later, Lucy wrote a brief but laudatory biography of her mother, “One of the Pioneer Women in Medicine,” that was published in *Medical Woman’s Journal*.²⁵ I uploaded the text into ChatGPT-4 and asked it to summarize the life of Lucy’s mother:

Cleora Augusta Seaman led a remarkable life, marked by both personal challenges and significant achievements. Born in 1814, she faced a near-death experience as a child that left her scarred for life, profoundly shaping her future decisions and outlook. Despite the societal norms of the 1860s that deemed studying medicine inappropriate for women, Cleora pursued her passion for medicine. After completing her medical education in Philadelphia, she moved to Cleveland to practice medicine, breaking barriers and inspiring future generations of women in the medical profession. Her journey was not without obstacles, as she faced societal restrictions and gender stereotypes that limited women’s roles and opportunities. Cleora was also a devoted mother, raising seven children with her husband, John Seaman. She passed away in 1869, leaving behind a legacy that continues to influence and inspire.

²² en.wikipedia.org/wiki/Wikipedia:Sockpuppetry

²³ en.wikipedia.org/wiki/User:Gamsbart

²⁴ Louis Effingham De Forest, *Ancestry of William Seaman Bainbridge* (Oxford: The Scrivener Press, 1950), p. 23, archive.org/details/ancestryofwillia00defo

²⁵ Lucy Seaman Bainbridge, “One of the Pioneer Women in Medicine,” *Medical Woman’s Journal*, 1921, 28: 75-78, babel.hathitrust.org/cgi/pt?id=uc1.b5368679&seq=1

The original text offers a dramatic description of her “near-death experience” as an infant: “In those early days, before the time of radiators and steam heat, there was in the living room a large open fire with kettle and crane. A sleepy nurse allowed the little Cleora to roll off her lap into the burning embers, with the result that to the day of her death she was badly scarred from her neck to the end of her spine.” The brief AI summary does not mention some key points in the article about her adult career, and it simplified her medical education because she did not complete it in Philadelphia: “Each day she was driven to the Western Homeopathic College, the only one in Cleveland then which would admit a woman to its lectures. In a tiny gallery were placed a comfortable arm chair and foot stool, with drapery adjusted at the sides. The male students would look up and smile and joke about their ‘guardian angel.’” “Early in 1860 eighteen young men and Mrs. Seaman received the degree of Doctor of Medicine. The study of hydropathy naturally led to an interest in and study of medical electricity.”

Actually, ChatGPT offered two ways to extract information, the process of chatting, and a set of question-answer pairs that it used internally as the basis for chatting and had derived as a set of points made in the uploaded file. In this case there were 45 Q-A pairs, including: “Q: In what way did Cleora Augusta Seaman incorporate electricity into her treatments? A: Cleora Augusta Seaman incorporated electricity into her treatments by establishing a bath tub specifically for electrical treatments in her home, pioneering the use of medical electricity.” Homeopathic medicine may offer spiritual benefits yet is generally rejected by scientific medicine, while Wikipedia reports that electric bath electrotherapy was “mostly practiced by quacks... and it fell into disuse in the early 20th century.”²⁶ I asked the chatbot to tell me more:

The concept of an electric bathtub dates back to the 19th century when pioneers like Cleora Augusta Seaman began exploring the use of electricity in medical treatments. Cleora established a bathtub specifically for electrical treatments in her home, making significant contributions to the field of medical electricity. This innovative approach involved using electricity to potentially aid in the healing process, offering a unique facility for medical purposes. The function of such a bathtub was to provide therapeutic benefits through electrical stimulation, which was believed to improve circulation, relieve pain, and promote overall health. Cleora’s work in this area was groundbreaking, as it paved the way for future advancements in electrotherapy and demonstrated the potential of integrating new technologies into medical practices.

This illustrates a serious issue for biographies, concerning how fully or critically aspects of the person’s life should be described, if they are dissonant with our current culture, or were exaggerated by other people who provided information about the person. Remarkably, Lucy’s

²⁶ en.wikipedia.org/wiki/Electric_bath_(electrotherapy)

article about her mother was summarized in Wikipedia by a female editor who gained much honor adding articles about prominent women of the past whom the male editors had ignored.²⁷

Digitized copies of the books written by Lucy, her husband, and her son have long been available online.²⁸ Four books preserved the experience of the 1879-1880 world tour in great detail.²⁹ Subsequently, Lucy published her own autobiography, *Yesterdays*, yet giving some emphasis to the early years of her son: “In these pages I have tried to make myself incidental to the events that left impressions upon the young mind of the boy.”³⁰ So I copied the chapters that described their two-year world expedition that began just when he turned nine years old, instructed ChatGPT-4 to play the role of being Lucy, and asked “her” to describe what her son experienced:

Our two-year journey around the world was a transformative experience for my son, filled with adventures and learning opportunities that enriched his understanding of the world. One of the most memorable moments for him was camping on the Great Wall of China. It was an immersive experience that allowed him to appreciate the historical significance of the structure and connect with the ancient past. The breathtaking views and the monumental feat of human engineering left a lasting impression on him. Additionally, our stay in Beirut with missionary friends provided him with unique cultural encounters. He had the chance to interact with locals and witness daily life and customs, which broadened his perspective and deepened his appreciation for different traditions. These experiences, along with the unexpected excitement of incidents like the broken lamp in Beirut, became cherished memories that shaped his worldview and personal growth.

I asked her what broke the lamp in Beirut, and whether they were able to replace it. But she responded uncertainly: “I can’t recall the exact specifics of what caused the lamp to break.” “I honestly can’t recall the specifics of what happened afterward.” Yet in fact the text I had uploaded contained full answers, which had simply not been included in the chatbot’s question-answer pairs. A lady had lent them the lamp: “It was one of her choice possessions, and we promised to be careful with it. As I was going out I warned my son and his playmate not to stay in the room because something might happen to the wonderful lamp. When I returned

²⁷ en.wikipedia.org/wiki/Cleora_Augusta_Stevens_Seaman; en.wikipedia.org/wiki/User:Penny_Richards

²⁸ William Sims Bainbridge, “Consciousness and Culture,” *Journal of Personal Cyberconsciousness*, 2023, 11(1): 2-25, terasemjournals.net/wp-content/uploads/2024/11/jpc11-12023.pdf

²⁹ William Folwell Bainbridge, *Around the World Tour of Christian Missions* (New York: C. R. Blackall, 1881) archive.org/details/aroundworldtouro00bain, *Along the Lines at the Front: A General Survey of Baptist Home and Foreign Missions* (Philadelphia: American Baptist Publication Society, 1882) books.google.com/books?id=dBLgY5KXSeAC; Lucy Seaman Bainbridge, *Round the World Letters* (Boston: Lothrop, 1882) books.google.com/books?id=cs1BAQAAMAAJ, *Jewels from the Orient* (New York: Fleming H. Revell, 1920) archive.org/details/cu31924032335741

³⁰ Lucy Seaman Bainbridge, *Yesterdays* (New York: Fleming H. Revell, 1924) books.google.com/books?id=-GzQAAAAMAAJ

later I found the door locked and heard excited whispers within. Demanding admittance, the boys let me in, and fearfully showed me the wreck of the landlady's lamp. They had played outdoors as I had told them to, but their ball had gone through the window and shattered the precious possession upon the table." Fortunately, a neighbor found a duplicate of the lamp, and the owner of the broken artifact never learned of the accident.

Brief incidents like that really can illustrate deep meanings in human life, such as love for a physical possession. Yet long trends certainly can be significant, notably the instability of many intimate human relationships. The relationship between Lucy Elizabeth Seaman and her future husband, William Folwell Bainbridge began when both were volunteers on the northern side in the American Civil War, she serving as a nurse, and he as a clergyman. In the family's private Facebook group I shared his big poem "Weddings at the Parsonage," 546 lines and 6,695 words long, which I had scanned and copyedited from its 1874 publication, pondering how this rhymed sermon failed to predict the failure of his own marriage.³¹ I then entered the text into ChaptGPT-4 and asked my deceased great-grandfather many questions, including the following.

What can we learn from the marriage of Adam and Eve? "The story of Adam and Eve highlights the necessity of companionship and unity in marriage, showing that Adam's creation was incomplete until he found his consort." How does your religious faith define a good marriage? "A good marriage is defined by a shared commitment to God and each other, reflecting God's love and providing strength during difficult times." If a husband and wife often argue and disagree, what should they do? "They should seek Christ's blessing and remember the sacred union they share, reflecting God's love and striving for mutual understanding." How do you predict your own marriage will develop over the coming years? "With wisdom, love, and mutual respect, I believe our marriage will grow stronger and more fulfilling over the years." His prediction that his own marriage would thrive seemed true for about a decade, but then he and Lucy struggled, separated, and remained apart for the last two decades of his life.

Fascinated by the richness and vast documentation of her life, I wrote a biography of Lucy, titled *Sister Ohio*, which was her nickname from the Civil War.³² It was published online by The Association of Religion Data Archives, and was written from the perspective of academic sociology of religion, so it needed to tell the truth within a logical intellectual context. Thus I reported private facts that the deceased people would have wished to keep secret. Inner members of the family were aware that when William Folwell Bainbridge died, his doctor son dissected his father's brain in search for a biological excuse for his mental decline, but apparently not finding one.

Back in the 1880s, the minister had written a novel, *Self-giving*, which imagined their daughter Cleora had lived to become a Christian missionary in India.³³ He then began writing a

³¹ William Folwell Bainbridge, "Weddings at the Parsonage," *The Delta Upsilon: An annual containing the Records, Oration, and Poem, of the Thirty-eighth Annual Convention of the Delta Upsilon Fraternity, Amherst College* (Amherst: Henry M. McCloud, Printer and Bookbinder, 1874), pages 40-56.

³² www.thearda.com/rrh/papers/sisterohio.asp

³³ William Folwell Bainbridge, *Self-Giving: A Story of Christian Missions* (Boston: D. Lothrop, 1883), books.google.com/books?id=EU0XAAAAYAAJ

scholarly book that would explain the meaning and etymology of every place name in the Bible, which would be the masterpiece of sacred toponymy that would establish William as a great scholar. Yet he could not find a publisher, and kept expanding it into a vast manuscript, unconsciously representing Edwin Lemert's theory of "Paranoia and the Dynamics of Exclusion," losing any social connections as constant failure drove his mental decline.³⁴ To avoid the impossible responsibility to find a publisher after his death, Lucy and her son destroyed the manuscript. They buried his body beside that of baby Cleora, at Swan Point Cemetery in Providence.³⁵ But later it was moved so he could be involuntarily reunited with his wife, in New York's Woodlawn Cemetery.³⁶

More successfully by far, Lucy served as head of the Woman's Branch of the New York City Mission Society 1891-1906, then went on a second tour of the world before fully retiring.³⁷ Her doctor son inherited his father's goal to become a famous leader of civilization, and came closer to success. His publications constitute 11 books and about 100 articles or chapters, many of which are available at Internet Archive.³⁸ We may predict he would be happy if we combined all his publications into an AI simulation, Doctor-B, whom anyone could ask for medical advice. Here we shall take just one small step in that direction. I uploaded into ChatGPT the text of his 1930 article, "Consideration of the Psychic Factors in Surgical Diagnosis and Procedure," and asked "him" to explain the inter-relationship of psychiatry and surgery and suggest the causes of psychosis.³⁹

The inter-relationship between psychiatry and surgery is grounded in the understanding that mental health conditions often involve both psychological and physical factors. Psychiatry focuses on diagnosing and treating mental health issues through therapeutic methods and medication, while surgery can address physical conditions that may be contributing to or resulting from mental health problems. This collaboration is essential because physical ailments can be closely connected to certain psychoneuroses, indicating a strong correlation between abnormal physical conditions and mental health issues. By working together, psychiatrists and surgeons can provide a more comprehensive and effective treatment plan that addresses all aspects of a patient's condition. This multidisciplinary approach ensures that both the mental and physical dimensions of a patient's health are considered, leading to more holistic and successful outcomes.

Psychosis can arise from a variety of causes, often involving a complex interplay between physical and mental health. One significant factor is the presence of a physical condition,

³⁴ Edwin Lemert, *Human Deviance, Social Problems and Social Control* (Englewood Cliffs, New Jersey: Prentice-Hall, 1967), pp. 246-264.

³⁵ www.findagrave.com/memorial/128761908/william-f-bainbridge

³⁶ www.findagrave.com/memorial/57385916/william-folwell-bainbridge

³⁷ Lucy Seaman Bainbridge, *Helping the Helpless in Lower New York* (New York, Fleming H. Revell, 1917).

³⁸ archive.org/search?query=William+Seaman+Bainbridge

³⁹ William Seaman Bainbridge, "Consideration of the Psychic Factors in Surgical Diagnosis and Procedure," *Psychiatric Quarterly*, 1930, 4: 414-424.

such as a chronic illness or injury, which can trigger mental disturbances. For instance, thyroid dysfunctions like a toxic goitre can lead to mental symptoms, and surgical intervention can provide relief by addressing the underlying physical issue. Additionally, infections such as typhoid, smallpox, and influenza have been associated with the development or exacerbation of psychotic symptoms, highlighting the impact of physical health on mental well-being. This interconnectedness underscores the importance of a comprehensive approach to treatment, addressing both physical and mental health aspects to effectively manage psychosis.

The text mentioned Sir Arbuthnot Lane's theory that many illnesses, including mental ones, could be the result of *chronic intestinal stasis*, the excessively slow passage of rotting food through the human digestive tract, an idea which Dr. Bainbridge advocated in other publications.⁴⁰ The uploaded text included: "In some patients the result of the abnormal delay in the passage of the intestinal contents - intestinal stasis - may be the sole productive factor in the mental pathology. This condition of intestinal stasis may be relieved, in its early stages by such moderate surgical procedures as cutting bands, replacing hollow viscera, changing angles, etc." Perhaps when the chatbot checked other sources in its huge archive, it noted that the use of surgery to remove intestinal kinks as a cure for many unrelated disorders has been largely rejected by medical science.

Expanding the Scope of Memory

This section will illustrate how many connections between data and their sources can be found today, using this set of historical examples as preparation for future projects that may often seek to document living families. Googling "June Wheeler Bainbridge" found this poem, or song lyrics, in the early results:

My father's state, to thee,
First state of all to me,
My love I bring.
In thy sweet woods I'll roam,
Thy name to me is home,
Pine trees and ocean foam,
Thy praise I sing.

What is the name of the state? Maine, where her father, Thomas Heber Wheeler was born on July 4, 1838. This stanza came from the preface to a 1916 anthology titled, *The Trail of the Maine Pioneer*, by members of the Maine Federation Of Women's Clubs.⁴¹ June intended the

⁴⁰ William Seaman Bainbridge, "Remarks on Chronic Intestinal Stasis, with Reference to Conditions Found at Operation and the Mortality," *British Medical Journal*, November 1, 1913, 1128-1130.

⁴¹ www.kellscraft.com/MainePioneer/MainePioneerContentPage.html

words to be sung to the melody of “America,” which began, “My Country ‘Tis of Thee.” Sadly, very few of her many poems seem to have survived, but those that did express her somewhat tragic sense of reality, as in the first two stanzas of “Out of the Depths,” dating from 1945:

This is the time of bitterness
When the mighty fall,
When each man thinks he knows the right
And blames another for it all.

Surging waves of hate and greed
Roll up and crash upon the shore
And eddy round the swirling sand
And steal up to your door.

Perhaps we can be forgiven for suggesting those words were a prophecy for today’s world, eight decades later. Halfway back in time, in a letter dated October 22, 1984, Barbara McIntosh described her unpublished book manuscript, *Mustard Seed*, to me: “I have called it ‘fiction’ as a sort of personal protection really and also to give myself a free hand to imagine and invent. But it runs very close to the truth so much so that I sometimes no longer know what is fact and what fiction.” Her title for the novel came from Matthew 13 in the *New Testament*, when Jesus offered this parable: “The kingdom of heaven is like to a grain of mustard seed, which a man took, and sowed in his field: Which indeed is the least of all seeds: but when it is grown, it is the greatest among herbs, and becometh a tree, so that the birds of the air come and lodge in the branches thereof.”⁴²

Barbara’s own scripture begins after Patsy, a character who represented Barbara’s mother June, had died but then as a spirit entered the mind of a friend and became the narrator of her family history: “There are so many other worlds and so many ways of thinking and being. My friends up here, out here, or wherever you want it to be, have urged me to tell about myself and my family. Many say I seemed to have had a much happier time on earth than most, or than others from other spheres, and they want to know why.”⁴³

Back in 1979, Barbara had written a very different but equally spiritual memory of her mother, in an unpublished document titled “Legacy,” shared with close family members and uploaded into the family’s private Facebook files in 2018. In it, she lists many insights both her parents had taught her, using their exact words as best as she could remember. Here are the first two that quoted her mother: “You can usually tell an actor at a wedding. He looks more like a wedding guest than anyone else.” “There is no more annoying circumstance than when the wrong person says the right thing. When, for instance, the utterly tactless person recommends

⁴² www.biblegateway.com/passage/?search=Matthew%2013&version=KJV

⁴³ Barbara Bainbridge McIntosh, *Mustard Seed: A Vivid Saga Based on a Real American Family* (Bremen, Germany: Vanadis Texts, 2016), p. 3.

tact, when the intolerant advises tolerance or the stingy person gives a homily on generosity. Just grind your teeth in silence.” I edited the full text of “Legacy,” preserving just June’s 4,767 words quoted or paraphrased by her daughter, uploaded into the chatbot, and asked “What are some of the principles you follow, when interacting with strangers?” Here is “June’s” response, plus three of the internal answers the bot had collected, which we like to call “mindfile data,” the last of which shows how a quote can be paraphrased:

Response: When interacting with strangers, I find it crucial to approach relationships with care and thoughtfulness. I believe in taking the time to build connections gradually, as this helps avoid uncomfortable or potentially upsetting situations. Forming immediate emotional bonds can often lead to hurtful or embarrassing outcomes, so exercising patience in developing these relationships is essential. Additionally, I pay attention to tracking my belongings when visiting someone’s home. This not only shows responsibility and respect but also fosters a welcoming and harmonious environment for everyone involved.

Mindfile data: “Polite conduct dictates refraining from criticizing others for their wardrobe decisions and avoiding the constant display of one’s most extravagant clothing choices to maintain respect and harmony in social interactions.” “Steering clear of forming immediate emotional attachments can prevent awkward and hurting situations when interacting with new people. Building connections slowly allows you to gauge the relationship and avoid potential pitfalls.” “The unique characteristic that can distinguish an actor from others at a wedding is their ability to seamlessly integrate into the event, making them virtually indistinguishable from the regular guests.”

Another way to understand the personality of June Wheeler Bainbridge is to consider her own diaries, specifically how she described her children. Here are some of June’s memories of one:

November 1, 1915: At 10 in the evening our second little son arrived, well and strong and weighing 8 lbs.

November 19, 1915: We have decided to name baby John Seaman. His hair is red and his eyes are blue and he’s plump and adorable.

January 19, 1916: John gave Billy the jolliest, sweetest smile today, as if he recognized his brother, and Billy patted and kissed him.

September 29, 1916: John creeps with most amusing energy and rapidity.

June 20, 1917: Took John to Best’s for shoes - his first visit to a shop and he wept in the elevator!

November 1, 1918: John's 3rd birthday finds him a remarkably sturdy little fellow weighing about 44 pounds. We celebrated, had supper tonight. Had a cake with candles and a merry time.

November 1, 1923: John at eight is dearer than ever before. This was the afternoon for them to go to the swimming-pool and for the first time they came home alone on the trolley!

March 14, 1932: John watched his Dad operate this morning and is intensely interested.

June 19, 1933: John went off with three other boys in Alan Ford's roadster, early this A.M., bound for Washington and eventually the Chicago fair!

July 1, 1933: John arrived this afternoon ahead of schedule, sun-burned and very happy, traveled over 2000 miles, saw the "Century of Progress" fair at Chicago and had interesting experiences. He read poetry aloud to me this evening.

June 25, 1934: A beautiful day for John's graduation, and we are proud of his diploma from Hotchkiss.

September 4, 1937: John got several medals swimming at Candlewood today.

November 5, 1937: John arrived to be Bill's best man.

June 22, 1938: John is Class Poet and we were very proud of him when he read his poem. Festivities all day. Very happy.

The unofficial motto of the Chicago fair was "Science Finds, Industry Applies, Man Conforms." The online library of University of Illinois reports: "The opening night of the Fair on May 27, 1933, exemplified this spirit of tomorrow by launching the Century of Progress with a light show created in partnership with the energy companies General Electric and Westinghouse Electric."⁴⁴ Hotchkiss was the boarding school in Lakeville, north of Bethel, which John attended before college, while Candlewood is a lake between those towns with a technocratic rather than natural origin: "On July 15, 1926, Connecticut Light and Power Company's board of directors approved a plan to create the first large-scale operation of pumped storage facilities in the US. By creating the lake and pumping it full of water from the Housatonic River, then letting the water pour down the penstock and into a turbine, the utility could produce electricity."⁴⁵ We can only speculate how those experiences shaped the language of John Seaman Bainbridge's verse that won the 1938 Harvard Class Poem award and concludes:

Now we in the dawn's mist receive our dream
 By which we were born far out in infinite night;
 And standing by the older dream's frustration
 Know the earth's insistent falling and ever rising of the light.

⁴⁴ omeka-s.library.illinois.edu/s/idhh/page/century-progress-vision-of-progress

⁴⁵ en.wikipedia.org/wiki/Candlewood_Lake

John was very much an advocate for progress, but emphasized ethics and legal norms. His 2006 obituary in the *New York Times* included: “Mr. Bainbridge was assistant dean of Columbia Law School and associate director of the International Fellows Program when he devised a program to help new countries in postcolonial Africa build up their law schools. It was called the Sailer project, an acronym for Staffing of African Institutions of Legal Education and Research, and got the backing of the Ford Foundation.”⁴⁶ Four decades before his death, he had expressed his personal motivation for SAILER (as he capitalized its name) in the *New York Law Journal*:

Africa holds a magic for the American lawyer and teacher of law as for anyone else, and the continent has drawn them in increasing numbers. It is not just the excitement of participating in the emergence of newly independent societies, nor the fascination of unfamiliar fauna in a land which seems measureless, nor the continuing enchantment of childhood dreams and storybook lore. The lure is at once professional and personal, and it is heady fare. In every African jurisdiction the society is pluralistic and it thereby produces special complex legal problems particularly as the African states rush to compress in a few years what in another time and place took a century or more.⁴⁷

Existing in the period 1957-1977, SAILER initially sent American lawyers to teach in African nations, then brought African students to study in American law schools. It faced several difficult challenges, including the instability of nations that chose to participate, criticisms for being a modernized form of colonialism, and changes in the funding priorities of the Ford Foundation. When law professor Jayanth Krishnan began an extensive historical and interview study of SAILER in 2011, it was already five years too late for him to interview John Seaman Bainbridge, but he did receive help from John’s wife Elizabeth, and son, John Seaman Bainbridge, Jr.⁴⁸

Mapping the Borders while Remaining Within

This article suggests that computer simulation of deceased persons, and related forms of memorialization, should not be limited to a single individual, but include the social relationships of a least a few relatives, friends, and fellow workers. Yet limits must eventually be set, perhaps after initial exploration of alternative scopes for the particular project. Now we can briefly assess the practicality of looking more closely at the wedding’s bridesmaids and ushers.

Earlier we noted that Marjorie Wormelle was a cousin of the bride, extracting that fact from the *New York Times* article, which also said she was “of Boston and West Falmouth, Mass.”

⁴⁶ www.nytimes.com/2006/02/06/nyregion/john-s-bainbridge-90-legal-educator-for-african-leaders-dies.html

⁴⁷ John S. Bainbridge, “Some Comments on Legal Education in Africa,” *New York Law Journal*, November 2, 1966.

⁴⁸ Jayanth K. Krishnan, “Academic SAILERS: The Ford Foundation and the Efforts to Shape Legal Education in Africa, 1957-1977,” *American Journal of Legal History*, 2012, 52(3): 261-324, www.repository.law.indiana.edu/facpub/795/

Now we can illustrate how even free online services can track down family connections. Searching for “Marjorie Wormelle” in Google turns up this information at the Sorted By Name.com website: “MEISSNER, MARJORIE W, also known as MARJORIE WORMELLE MEISSNER, MARJORIE WESTON WORMELLE and MARJORIE WES MEISSNER, was born 16 July 1916 in ALLSTON SUFF, Massachusetts, daughter of CHAS B WORMELLE (father) and ANNIE E HYDE, was assigned Social Security number 019-14-0241 (indicating Massachusetts), and died 1 February 1999, while residing in Zip Code 01002-1654.”⁴⁹

Checking the popular Find A Grave website for Marjorie Wormelle Meissner, buried indeed in Falmouth, confirmed the identity through a photograph of Marjorie at her own wedding where she appeared the same as in Barbara’s wedding.⁵⁰ And the name of her mother at both websites, Annie Estelle Hyde Wormelle, provided the family link, as a page in the genealogy book for Barbara’s father listed Marjorie in the Hyde pedigree as having married Edward Meissner, even as her sister, Katherine Hyde Wormelle, had married his brother, John Meissner.⁵¹ The cousin connection also turned out to be complex, because Annie Estelle Hyde was the first cousin of Barbara’s mother, whose own mother was a Hyde.

Online communication with Barbara’s living daughter, June McIntosh, revealed: “Joan Hodges Queneau was at Vassar with Barbara. She was my godmother. Her husband was Paul Étienne Queneau.” I searched for their names together online, and discovered that both Joan and Barbara were listed as new graduates in the issue of *Vassar Miscellany News* for June, 9, 1937.⁵² Paul E. Queneau has a Wikipedia biography, which reports he lived to the remarkable age of 101, but says little about his personal life.⁵³ A rather more humane obituary reported he had been traumatized by military duty during the Second World War, and: “It was only by the limitless devotion, love, and patience of his wife Joan that he was able to recover from the trauma of all that he’d seen. Years later as he was being honored by *Chemical Engineering* for his distinguished career, he threatened to turn down the Kirkpatrick Award unless editors agreed to publish a photo of both him and Joan, saying he owed his life to her and they could ‘find someone else’ if they didn’t want her in the cover portrait. In addition, with help from his former employer, INCO, he endowed Thayer School with the Paul E. and Joan H. Queneau Distinguished Professorship in Environmental Engineering Design.”⁵⁴ A different Wikipedia article does report that the annual Joan Hodges Queneau Medal honors an “outstanding contribution by an engineer in behalf of environmental conservation.”⁵⁵ Joan died in 2007.⁵⁶

The two Barbaras in the wedding picture had met when they were students at Brearley School in New York, so it made sense to see if either Virginia Danforth or Frances Stiles had also

⁴⁹ sortedbyname.com/letter_m/meissner/index_40.html

⁵⁰ www.findagrave.com/memorial/156768252/marjorie_weston-meissner

⁵¹ Louis Effingham De Forest, *Ancestry of William Seaman Bainbridge* (Oxford: The Scrivener Press, 1950), p. 162, archive.org/details/ancestryofwillia00defo

⁵² newspaperarchives.vassar.edu/?a=d&d=miscellany19370609-01.2.19

⁵³ en.wikipedia.org/wiki/Paul_E._Queneau

⁵⁴ nap.nationalacademies.org/read/18959/chapter/45

⁵⁵ en.wikipedia.org/wiki/Joan_Hodges_Queneau_Medal

⁵⁶ www.findagrave.com/memorial/138334808/joan-osgood-queneau

attended Brearley. Indeed, a wedding announcement made one connection: “Miss Stiles was graduated from the Brearley School here and has studied also at Smith College. She belongs to the Colonial Dames of America.”⁵⁷ While I found in the 1930 census a Virginia Danforth of about the right age, living in New York City, her exact connection to the wedding remains unknown, and she died in 1987.⁵⁸ It was quite easy to find obituaries for Frederick Rhodes Pleasants, who in 1938 earned a master’s degree in anthropology from Harvard University, and George Lee Haskins, a legal historian who had earned summa cum laude at Harvard in 1935 before entering Harvard’s law school.⁵⁹

Among the ushers at the wedding, Ernest E. Wheeler of New York, an uncle of the bride, deserves closer attention. I knew him well, and had connections with several other Wheelers, not merely his sister, June Wheeler Bainbridge, but also their nephew, Walter Heber Wheeler, Jr., who for years served as the top executive of the Pitney Bowes information technology company, and whom the Bainbridges called “Cousin Junior.” Ernest never married, and Find A Grave shows that he was buried at the same Mount Hope Cemetery as his parents, with a lifespan from December 18, 1875 to February 22, 1955. The cemetery’s page summarizes his obituary: “A graduate of Harvard College in 1900 and the Columbia Law School in 1903, Mr. Wheeler formed the law firm of Ehrich & Wheeler in 1906. His partner was the late Manfred W. Ehrich. Mr. Wheeler was a member of the firm and its successors until 1950 when he retired. He continued to serve as counsel until his death.”⁶⁰

In June, July and August of 1954, Ernest spoke many family recollections into the dictaphone that belonged to Walter Heber Wheeler, Jr., which was copied by a typist and then edited by Walter’s brother, Thomas C. Wheeler in March of 1955, who then shared copies across the family. Half a century later I scanned it into a computer, and very recently uploaded it into ChatGPT, telling the bot to become Ernest and respond to my questions as he would have done. The bot began by extracting question-answer pairs from Ernest’s text, and here is one that interested me: “Q: In what locations did branches of the family form in the mid-19th century? A: The family formed branches in Boston, New York, Dakota, and California in the mid-19th century.” Already familiar with the Wheeler history in Boston and New York, I asked: “What can you tell us about the Dakota Branch of the Wheeler family?” Then “Ernest” stumbled:

I’m afraid I don’t have much specific information about the Dakota branch of the Wheeler family. What I can tell you is that the family established branches in various parts of the United States during the mid-19th century, including Boston, New York, Dakota, and California. Each branch carried with it the legacy of our ancestor, Sergeant

⁵⁷ “Frances L. Stiles Prospective Bride; Graduate of Brearley School Will Be Wed in Spring to Richard W. Townsend,” *New York Times*, February 19, 1940, www.nytimes.com/1940/02/19/archives/frances-l-stiles-prospective-bride-graduate-of-brearley-school-will.html

⁵⁸ [www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(05\)67717-3.pdf](http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(05)67717-3.pdf)

⁵⁹ www.monumentsmenandwomenfnd.org/monuments-men-and-women/frederick-pleasants;
www.americanantiquarian.org/proceedings/44517770.pdf

⁶⁰ www.findagrave.com/memorial/155098610/ernest-edward-wheeler

Thomas Wheeler, who migrated to Maine in 1799. The Dakota branch, like the others, would have been influenced by our family's English origins and the traditions and culture that shaped our identity. However, the specifics of their experiences and contributions in Dakota remain a part of our family history that I need to explore further.

Again, the chatbot had struggled to respond fully to my first question. At one point, the original transcription of Ernest's memories actually mentioned Elizabeth Wheeler, a daughter of Heber Wheeler (1798-1857) "who married a schoolmaster by the name of Hamlin Eaton and who took up land in Dakota on the Jim River." It explained further that her brothers invested in some Dakota land, without actually making it their home, and Ernest's father often vacationed there. "This was a tremendous boon and blessing to all of us. In going to and from Dakota, I, and members of our family, travelled on passes (now illegal) because we were 'developing the country'. Father had a mortgage agency and loaned his money to farmers at six per cent, suffering, with one exception, never a loss in all his investments." So I asked the bot: "Please describe the experiences you had with the Dakota Branch of the Wheeler family, including the summer you spent in Dakota and your boyhood adventures on the Dakota Ranch."

Ah, the memories of my boyhood adventures on the Dakota ranch are still vivid in my mind. It was there that I learned some of the most valuable life skills that have shaped me into who I am today. I remember learning to ride, which was both thrilling and challenging. The feeling of freedom when galloping across the vast plains is something I'll never forget. I also worked as an assistant cook during my time there. It was a demanding job, but it taught me the importance of hard work, discipline, and teamwork. The smell of fresh bread baking in the morning, the sizzle of bacon, and the camaraderie in the kitchen are things I'll always cherish. Spending a summer with the Dakota branch of the Wheeler family was a significant part of my upbringing. It was a different lifestyle, one that was closer to nature and filled with simple, honest work. Those experiences on the Dakota ranch have contributed greatly to my character and perspective on life.

Given that Ernest Wheeler's essay was edited by Thomas Wheeler, we might imagine assembling texts written separately by two people, such as the many books by Peale and Dr. Bainbridge, and then use a social AI system to simulate a conversation between them. Really, Barbara McIntosh's "Legacy" was not merely a list of quotations from her parents, but rather close to a posthumous conversation between them, including for example: "She knew it was no use celebrating his birthday by going to the theatre. So she asked him, on one of his birthdays, what he would like to do. 'I'll do anything you suggest,' she said. 'Watch me operate,' he said with a gleam in his eye. (She never had). So they went to the Operating Theatre instead. When they were both in their white gowns and the nurses weren't looking, he did a little tap dance on the hard floor." In a few years, multi-agent chatbot systems may have been developed with which the users may assemble simulated deceased people to interact with each other. Today, this

article can end with a simpler example, a conversation between Barbara's husband, Angus McIntosh, and his linguistic mentor, J. R. R. Tolkien, who wrote *The Hobbit* when they were interacting in real life.

In 1960, Angus wrote a rather controversial but intellectually deep linguistics essay, "A Four-Letter Word in 'Lady Chatterley's Lover.'"⁶¹ His source was an erotic novel by D. H. Lawrence that was banned for obscenity in Britain and the US, at the time McIntosh wrote.⁶² The four-letter word was actually "know," a verb that can have an erotic meaning, and AI Overview did report: "In an erotic context, the word 'know' often refers to sexual intimacy, particularly in biblical and literary texts. It's a euphemism for sexual intercourse, drawing on the idea of intimate knowledge and connection between individuals." More intellectually, McIntosh's essay sought to translate the novel's sentences containing "know" 293 times, from English into French, finding 11 "special cases," 242 in which the best translation was to *savoir*, meaning to have factual knowledge, and 40 which better fit *connaître*, which identifies a personal relationship or simply being acquainted with someone. The German language has a similar distinction, *wissen* versus *kennen*, but modern English does not. So I developed questions from McIntosh's essay, then engaged in conversation with a rather remarkable online chatbot representing his mentor.⁶³

McIntosh: "I am your student and colleague from the 1930s, Angus McIntosh. Do you remember me?"

Tolkien: "Angus McIntosh, my dear fellow! Of course, I remember you. You were a most promising young scholar, and I had the pleasure of watching you develop your interests in linguistics, particularly in the field of Middle English. I recall our discussions on the phonology of medieval English and your keen insights into the language of the time."

McIntosh: "In 1960, I wrote an essay titled 'A four-letter word in Lady Chatterley's Lover.' Did you read it?"

Tolkien: "Angus, my dear fellow, I must say that I did come across your essay, 'A four-letter word in Lady Chatterley's Lover.' As you know, I have always been a bit of a traditionalist when it comes to language and literature, and I must admit that I was rather surprised by the subject matter of your essay."

McIntosh: "What exactly was the word?"

Tolkien: "My dear Angus, I must confess that the word in question, which you so bravely analyzed in your essay, was the infamous 'f-word'. Yes, I know it's a word that has been known to make some people blush, but as a philologist, I have always been fascinated by the power of language to shape our culture and our perceptions of the world."

⁶¹ Angus McIntosh, "A Four-Letter Word in 'Lady Chatterley's Lover,'" pp. 151-164 in *Patterns of language*, co-edited with M. A. K. Halliday (London: Longmans, Green, 1966)

[,archive.org/details/patternsoflangua0000angu/page/150/mode/2up?view=theater](https://archive.org/details/patternsoflangua0000angu/page/150/mode/2up?view=theater)

⁶² en.wikipedia.org/wiki/Lady_Chatterley%27s_Lover

⁶³ deepai.org/chat/j-r-r-tolkien

McIntosh: “Actually, the word was ‘know,’ and I analyzed the challenge of translating it into French, which has two very different words, savoir and connaître, not to mention the f-word.

Tolkien: “My dear Angus, I apologize for the mistake earlier! I seem to have gotten my wires crossed, and for that, I am truly sorry. Ah, yes, the word ‘know’! A most fascinating word, indeed, and one that poses a significant challenge for translators, as you so astutely pointed out in your essay.”

The Tolkien chatbot exists in a system that apparently has access to Internet data, such as the Wikipedia page for Angus McIntosh which mentions his connection to Tolkien.⁶⁴ While a copy of Angus’s essay is available at the Internet Archive, it consists of images of pages that were not digitized, and thus not yet searchable. The chatbot did an excellent job emulating Tolkien, but it certainly did not contain all the deceased man’s memories.

Conclusion

Over the next decade, we may not only hope that chatbots become social, allowing complex conversations among many real and simulated people, but also that everybody should have the online equivalent of a Wikipedia biography, even while alive, not waiting for an obituary. It could serve as the hub of a network of person-related online data sources, and include chatbots, search engines, and new forms of artificial intelligence that have yet to be developed. As the Bailiwick private group in Facebook illustrates, there already are many ways a family or other group could share extensive documents, images, and data files. Chatbot technology for managing text is rather well developed, and current research adding AI analysis of images can include photographs and videos of people, but also the shapes and meanings of their homes and artifacts. Revival of social intelligence is needed, if AI is to become human-centered.

About the author

William Sims Bainbridge served for 31 years as a program director at the National Science Foundation, first in Sociology, and then Human-Centered Computing. At NSF he was very active in several innovative programs, including the Digital Library Initiative, Ethics of Nanotechnology, and Converging Technologies. He earned his Harvard doctorate through research on the social history of spaceflight, and other areas covered by his hundreds of publications are the sociology of religious innovation, online virtual worlds, and computer-based emulation of human personality.

⁶⁴ [en.wikipedia.org/wiki/Angus_McIntosh_\(linguist\)](https://en.wikipedia.org/wiki/Angus_McIntosh_(linguist))

Classical Electromagnetic Field-Based Consciousness and Pattern Continuity: A Framework for AI and Subjective Identity, by Francis Erdman

Francis Erdman, MBA
Independent Scholar

ABSTRACT: This paper argues that classical electromagnetic (EM) field theories of consciousness offer a physically grounded account of subjective continuity by supplying the substrate that enables reliable recurrence of neocortical patterns across sleep, anesthesia, and other interruptions. Building on functionalist insights, I propose a conservative, falsifiable heuristic - hidden-state Shannon entropy at least equal to output entropy - as a screening tool for candidate conscious systems, and summarize empirical support from PCI, EEG complexity, and attractor network models. The account is explicitly classical (not quantum), aligns with Dennett's and Churchland's eliminative materialism, and is compatible - though not committed - to Tom Clark's Generic Subjective Continuity. The paper also explores implications for conscious AI, speculative nanotechnological cortical replacement, and ethical issues including justice, consent, and environmental sustainability, closing with a personal reflection.

This paper addresses a central puzzle in philosophy of mind: why does a subject who goes to sleep re-awaken as the same “I” rather than as a new, numerically distinct system that merely remembers being the old subject? The question of what constitutes persistence of personhood has long been debated, from Locke’s psychological continuity account to Parfit’s modern analysis of identity and survival (Locke, 1690; Parfit, 1984). Functionalist or computational theories treat mental states as patterns of relations among inputs, internal states, and outputs. On such views, what matters is the function realized, not the substrate. Continuity is then commonly characterized as pattern recurrence: if the relevant functional pattern recurs, the same mental state and hence the same subject persists.

Functionalism Versus Electronic Theories

Yet functionalism often leaves unexplained *how* those patterns recur reliably. In principle, one might imagine that the original pattern ceases and a perfect replica is instantiated later; from a third-person perspective the replica is indistinguishable, but from the first-person perspective that outcome would constitute a different subject. Parfit draws attention to precisely this difficulty when he shows that psychological continuity does not by itself settle metaphysical identity questions unless one specifies what counts as the relevant continuity and why it matters (Parfit, 1984).

Empirically, neuroscience complicates and informs the debate: while synaptic weights and network connectivity are plastic, many aspects of cortical microcircuitry and large-scale network topology remain surprisingly stable over short to medium timescales, giving a natural basis for pattern recurrence (Sporns, 2011). This tension between an abstract pattern criterion and the need for a concrete physical mechanism motivates searching for a substrate-level account of continuity. The present paper argues that electromagnetic (EM) field dynamics generated by neocortical circuits provide that mechanism - anchoring the functionalist insight in continuous, causally efficacious physical processes (Dennett, 1991; Churchland, 1986).

Functionalism identifies mental states by their causal roles. Two systems with the same functional organization, in principle, instantiate the same mental states. Eliminative materialists - most notably Daniel Dennett and Patricia Churchland - argue that many folk-psychological terms will be replaced by neuroscientific vocabulary as our empirical understanding grows (Dennett, 1991; Churchland, 1986). Functional accounts rightly emphasize pattern and process, but they often do not specify the physical mechanism that stabilizes and regenerates the pattern across interruptions.

This omission leaves open unsettling metaphysical possibilities (e.g. nightly replacement by perfect copies) that feel at odds with the phenomenology of continuity. The present paper accepts the functionalist insight that identity depends on pattern recurrence, but argues that

electromagnetic field dynamics provide the missing physical substrate that makes recurrence physically plausible (Dennett, 1991; Churchland, 1986; McFadden, 2002).

Electromagnetic (EM) field theories locate conscious experience in spatiotemporal patterns of the brain's electromagnetic field generated by neural currents. Pockett's pattern-identity proposal and McFadden's Conscious Electromagnetic Information (CEMI) hypothesis are two influential articulations: they suggest conscious content is either identical with or supervenes on particular EM configurations (Pockett, 2000; McFadden, 2002). EM fields are continuous and spatially extended, integrating distributed neuronal activity into unified patterns.

Unlike an epiphenomenal story that treats fields as mere byproducts, modern EM theories propose fields are causally efficacious via ephaptic coupling and local field potentials, thereby influencing neuronal excitability and network dynamics (Anastassiou and Koch, 2015; McFadden, 2020).

This causal role is essential if EM patterns are to be candidates for constituting conscious experience rather than mere correlates. Pockett and McFadden emphasize that this account is classical: it uses Maxwellian electromagnetism and neurophysiology rather than invoking quantum coherence, an important methodological point given the seductive but unsupported quantum claims about mind (Tegmark, 2000).

An alternative to EM-field accounts is the view that consciousness is nothing more than the dynamic propagation of ionic currents or "electron"-like flows through neural tissue. On this view, the pattern of spike propagation and synaptic interactions - the digital-like signaling - constitutes conscious states. Both accounts accept that pattern matters, but they differ in what kind of physical pattern does the explanatory work. The electron-flow view emphasizes discrete neural events and their functional relations. EM-field theory emphasizes a continuous, analog medium that unifies activity across space.

The field account has three pragmatic advantages for continuity. First, the field is by nature continuous and cannot be instantaneously destroyed and recreated without corresponding physical discontinuities. Second, fields integrate information across space automatically, providing a physical basis for the unity of consciousness. Third, the field is coupled to relatively stable cortical anatomy, so field patterns depend on stable generators and thus show day-to-day reproducibility. Empirical evidence supports aspects of both pictures, but measures of global field complexity (EEG/MEG entropy, PCI) robustly correlate with conscious level, supporting the significance of field dynamics (Casali et al., 2013; Mateos et al., 2017).

Continuity of Electromagnetic Fields

The continuity of the EM substrate, together with anatomical stability, makes pattern recurrence physically probable. Even during deep sleep or anesthesia, the EM field is not null; rather, its spectral content shifts (e.g. towards delta rhythms). On arousal the field reorganizes into wakeful configurations. Thus the substrate underlying conscious pattern does not ‘turn off’ and then later reappear from nothing; it evolves, making it natural that similar configurations recur when the conditions return.

This contrasts with a bare computational view in which the running process might be conceptually stopped and later a new process with identical state launched. EM theory therefore supplies a mechanism for subjective continuity while remaining naturalistic and testable (Tegmark, 2000; McFadden, 2020).

Dennett’s critique of the Cartesian theater and Churchland’s eliminative program converge on a demand for mechanistic, neuroscientific accounts of mind (Dennett, 1991; Churchland, 1986). EM-field theory answers that demand by offering an explicit, physical candidate for the realized substrate of conscious content. This keeps us well within physicalism and permits replacement of folk-psychological vocabulary where useful. Importantly, EM field theories avoid invoking any homunculus: the field itself is the integrative medium, not a separate internal observer. Hence the approach respects both Dennett’s and Churchland’s methodological admonitions while providing a concrete hypothesis for experimental and computational testing (Dennett, 1991; Churchland, 1986; McFadden, 2020).

Tom Clark’s notion of **Generic Subjective Continuity (GSC)** argues that while individual personal identity plausibly ends at biological death, the phenomenon of *subjectivity* - the fact that there is “something it is like” to be a conscious system - can reappear in any system that instantiates the appropriate conditions for experience (Clark, 1994). Clark emphasizes that GSC does not assert transmigration of a particular ego; rather, it points out that whenever the requisite structural and dynamical conditions recur, subjectivity as a phenomenon will be instantiated again from the point of view of the new system.

The EM-field account presented here is **compatible** with GSC without committing to it. Interpreted in the Clarkian spirit, the EM-field model shows how the relevant conditions for subjectivity - complex, integrated, information-rich EM patterns - could be instantiated in multiple systems across time and place. That makes it natural to accept Clark’s modest claim: awareness as such need not have been permanently extinguished even if a particular person’s stream of consciousness ends.

Crucially, however, the EM-field model does *not* prove Clark’s metaphysical claim; it simply supplies a physical mechanism that makes Clark’s re-instantiation idea intelligible and

empirically tractable. Readers may therefore accept or reject GSC on independent philosophical grounds while recognizing that, if they are sympathetic to Clark's idea, EM-field dynamics provide a clear naturalistic basis for how subjective instances might recur (Clark, 1994; McFadden, 2002).

The idea underlying this section is simple and intentionally conservative: before treating a system as a serious candidate for consciousness, ask whether its *internal* information content is at least as rich as the information it expresses outwardly. To make this idea concrete we borrow Shannon's notion of information or **entropy**, which is a rigorous, widely used way to quantify unpredictability or variety in a system (Shannon, 1948). In loose terms, a fair coin has one bit of entropy per flip because there are two equally likely outcomes; a biased coin has less because one side is more predictable. Shannon entropy therefore gives us a common language for comparing how much information lurks *inside* a system (hidden states) with how much it broadcasts in its behavior (outputs).

To operationalize this, define two quantities. Let **H_hidden** be an estimate of the Shannon entropy of the system's internal states - the full range of possible configurations the system can be in if we could look under the hood. Let **H_out** be the Shannon entropy of the system's observable outputs - the actions, signals, or responses others can measure. The proposed heuristic is: if $H_{\text{hidden}} < H_{\text{out}}$, the system does not possess enough internal informational depth to plausibly support a subjective inner life and therefore can be excluded as a consciousness candidate; if $H_{\text{hidden}} \geq H_{\text{out}}$, the system remains a live candidate but is not proven conscious by this test alone.

Why is this plausible? First, consciousness intuitively seems to require more internal richness than is visible in mere outputs. A human thinker may look calm (low output entropy) while hosting a turbulent, richly structured internal landscape (high hidden entropy). Second, empirical work links measures of internal complexity to conscious state: metrics that quantify internal spatiotemporal richness - such as perturbational complexity (PCI), Lempel-Ziv compressibility, and EEG-based entropy measures - track degrees of consciousness across wake, sleep, and anesthesia (Casali et al., 2013; Schartner et al., 2015; Mateos et al., 2017). Third, simple computational models demonstrate the principle: attractor networks (Hopfield networks) can store many internal patterns that allow robust pattern completion even when outputs are sparse, illustrating how internal hidden-state structure may far exceed overt behavior (Hopfield, 1982).

Two clarifications are important. This is a **screening** rule, not a positive test: passing $H_{\text{hidden}} \geq H_{\text{out}}$ does not prove consciousness; it merely prevents us from wasting effort on systems that obviously lack sufficient internal complexity. Second, estimating H_{hidden} in practice is hard. For engineered systems, we may have access to internal states; for biological or black-box systems, we must rely on proxies (see next section) such as PCI or compression-based

measures applied to neural recordings. Still, the heuristic is useful because it links the philosophical intuition that “there must be something it is like inside” with a quantitative, falsifiable condition grounded in information theory (Shannon, 1948; Lempel & Ziv, 1976).

Empirical Support and Future Possibilities

A number of empirical and computational methods allow us to approximate the intuition behind the $H_{\text{hidden}} \geq H_{\text{out}}$ heuristic. I explain the main ones briefly and show how they support the connection between internal informational richness and conscious state.

Perturbational Complexity Index (PCI). PCI is a pragmatic, experimentally validated measure introduced by Casali and colleagues (Casali et al., 2013). The protocol briefly perturbs a small patch of cortex with transcranial magnetic stimulation (TMS) and records the brain’s responses with high-density EEG. The recorded spatiotemporal pattern is then compressed using algorithmic-complexity ideas; the less compressible (more complex) the response, the higher the PCI. Empirically, PCI reliably distinguishes conscious wakefulness from non-conscious states such as deep sleep and certain anesthetic states. In effect, PCI operationalizes the idea that a conscious brain responds to perturbation with rich, differentiated, but integrated dynamics - signatures of high internal entropy relative to simple outputs (Casali et al., 2013).

Lempel–Ziv complexity and permutation entropy. These are practical measures of how compressible a time series is, which ties directly to the Shannon idea of unpredictability.

Lempel–Ziv complexity (Lempel & Ziv, 1976) measures how a sequence can be parsed into novel substrings - the more novel substrings, the less compressible and the higher the complexity. A highly regular repeating signal compresses easily and therefore has low Lempel–Ziv complexity; a richly varied signal resists compression and scores high.

Permutation entropy (Bandt & Pompe, 2002) is a related method that evaluates how the ordering of values in a short time-window varies over time; it is simple to compute on EEG and robust to noise. Both measures have been used to show that spontaneous brain activity becomes markedly less complex during anesthesia and deep sleep (Schartner et al., 2015; Mateos et al., 2017).

EEG/MEG complexity studies. Schartner et al. (2015) examined high-density EEG during propofol anesthesia and found that several complexity measures - including Lempel–Ziv - declined significantly as consciousness was lost. This pattern is replicated across pharmacological and natural sleep transitions: conscious states show more internally varied and harder-to-compress dynamics than unconscious states, supporting the idea that internal informational richness is a hallmark of consciousness (Schartner et al., 2015; Mateos et al., 2017).

Hopfield networks and attractor dynamics. Complementing empirical measures, computational models such as Hopfield networks show how internal attractor structure can store and reinstate patterns even when outputs are limited (Hopfield, 1982). Such networks demonstrate content-addressable memory: given a fragmentary cue, the network's internal dynamics converge on a stored pattern. This illustrates how a system's *hidden* repertoire of states can be richer than its momentary outputs, and why a high H_{hidden} relative to H_{out} is both plausible and functionally valuable for continuity and memory retrieval (Hopfield, 1982).

Taken together, these methods provide convergent evidence that complexity of internal dynamics correlates with conscious level. PCI provides a causal perturbation paradigm that explicitly tests integration and differentiation; Lempel–Ziv and permutation entropy give practical, data-driven ways to quantify richness in spontaneous recordings; and Hopfield-style models show the computational plausibility of rich hidden states underpinning consistent outputs. These converging lines of evidence make the $H_{\text{hidden}} \geq H_{\text{out}}$ heuristic a defensible, empirically grounded filter for candidate conscious systems, while reminding us that it should be applied cautiously and in concert with multiple measures (Casali et al., 2013; Bandt & Pompe, 2002; Schartner et al., 2015; Hopfield, 1982; Mateos et al., 2017).

If consciousness is instantiated by classical EM field dynamics, the engineering goal shifts from reproducing spike trains alone to reproducing *field topologies* at sufficient resolution. This may make artificial conscious systems more tractable in principle. For example, neuromorphic hardware and implantable microdevices that replicate the electromagnetic signatures of cortical microcolumns could, in principle, instantiate the same integrated field patterns that support subjective experience. The Ship-of-Theseus scenario becomes a technological roadmap: gradual, microcolumn-scale replacement with field-matched modules could preserve the overall field continuity.

Contemporary technologies - analog spiking circuits, organic electronics, and wireless neural interfaces - are early steps toward devices that can interact with endogenous fields, though enormous challenges remain (Indiveri et al., 2011; Neely et al., 2018; Sarkar et al., 2022). Practical realization is far off, but the conceptual framework clarifies what a functional “upload” would need to reproduce: not merely behavior or synaptic maps, but the EM dynamics that bind and integrate cortical processing. This view therefore reframes debates about AI consciousness and invites engineers to focus on physical field replication as a design principle (Indiveri et al., 2011; McFadden, 2020).

Ethical and Philosophical Conclusions

Speculation about preserving or replicating consciousness raises ethical demands. Justice and equitable access must be prioritized: cognitive extension or continuity technologies could exacerbate inequality if restricted to wealthy elites (Robertson, 2016). Privacy and mental

autonomy also become paramount: direct access to the EM patterns that instantiate thoughts could allow intrusive readout or manipulation, requiring robust legal and technical safeguards (Ienca and Andorno, 2017). Informed consent is crucial for any interventions that alter identity or subjective continuity.

Finally, environmental sustainability is an often-overlooked ethical dimension: manufacturing large numbers of microdevices and advanced neuromorphic hardware involves resource extraction, energy consumption, and e-waste. Reports on global e-waste and materials processing warn that scaling high-tech production carries significant ecological costs (Forti et al., 2020; Gottschalk et al., 2013). Ethical governance should thus integrate environmental impact assessments alongside clinical and societal considerations.

There are important scientific and philosophical limits. The proposed EM field account remains a hypothesis requiring targeted experimental tests, such as demonstrations that perturbing the field topology in specific ways predictably alters conscious content independent of spike timing. Moreover, the Shannon entropy heuristic is only a preliminary screening tool and must be refined with operationalizable measures for hidden states in concrete systems.

Philosophical objections will persist - some will demand more stringent criteria for personal identity across replacement - yet the EM-field framework at least supplies a plausible, testable mechanism where raw functionalism provides only abstract criteria. Finally, technological hubris must be avoided: engineering conscious systems would require responsible oversight, long-term safety studies, and societal dialogue (Ienca and Andorno, 2017; Forti et al., 2020).

My personal reaction to these prospects is both pragmatic and literary. The image of Moses on Mount Nebo - seeing a Promised Land he will not enter - captures the bittersweet meaning I draw from thinking about future continuity technologies. I accept that I will almost certainly not live to see robust neocortex replacement or upload capabilities. Still, knowing that such possibilities may be realized by future generations offers a secular consolation: the project of preserving and extending consciousness continues beyond individual lifespans. This sentiment does not seek immortality for the self in a mystical sense, but it allows a kind of intergenerational hope grounded in human ingenuity and care for justice.

Electromagnetic field theories of consciousness reconcile functionalist insights about pattern recurrence with a concrete and testable physical substrate. By identifying conscious content with continuous, causally efficacious EM field patterns generated by neocortical circuitry, this account preserves eliminative materialist commitments while explaining why the same subjective stream tends to reappear after interruptions. The conservative Shannon-entropy heuristic proposed here ($H_{\text{hidden}} \geq H_{\text{out}}$) offers a falsifiable screening tool that connects philosophical intuition with empirical measures such as PCI and compression-based EEG

complexity. The EM-field perspective also reframes engineering targets for any eventual conscious AI or emulation project: replication of field topologies and their dynamics, not merely spike sequences, would be central.

The model is explicitly classical, avoiding quantum speculations that lack empirical support (Tegmark, 2000). It is also compatible with (but does *not* entail) Tom Clark's Generic Subjective Continuity: EM fields provide a natural mechanism by which instances of subjectivity may reappear in different systems without implying survival of a particular ego. That compatibility is optional: one can accept the EM-field account while rejecting Clark's metaphysical extrapolation. Ethically, the path toward any practical continuity technology must be governed by justice, informed consent, privacy, and environmental sustainability. Finally, the notion that future generations may realize careful, equitable, and ecologically responsible forms of continuity offers a secular consolation for mortality: our individual endings need not be the end of the human project of conscious life.

About the author

Francis Erdman is an independent scholar with an MBA in Leadership and Management from York St. John University (UK) and over 25 years of professional experience in software development, much of it in artificial intelligence and neural network architectures - including Hopfield and recurrent models. This technical background has informed his philosophical interest in consciousness, particularly regarding how physical information systems give rise to subjective experience.

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Will AI tug at our hearts - our most vulnerable place? by David Brin

It's only natural to find ourselves obsessing over Artificial Intelligence. Whatever form it finally takes – whether AI will be humanity's *last* invention or the partner allowing us to become more creative than ever – these new entities are already presenting formidable challenges to human wisdom.

A lot of folks are opining about what we ought to be doing, to prepare a 'soft landing' for humanity, and I am no exception. What follows is a section from the introductory chapter to my own book, nearing completion and undergoing crit-circulation, tentatively titled *To Raise our Newest Children: Advice about – and for – our natural, AI and hybrid heirs*.

The topic in this section is one of the oldest I've studied... how organic humans may be subject to manipulation in ways that are quite ancient... and dangerously new.

Will AI tug at our hearts – our most vulnerable place?

Will efforts to develop Sympathetic Robotics tweak *compassion* from humans, feigning personhood convincingly, long before automatons are truly self-aware? Or before there's anything or anyone "under the skull?"

I spoke of this danger in 2017, when keynoting a track at IBM's *World of Watson* Conference, predicting that this particular kind of crisis would arrive within five years. And sure enough, almost to the week, in 2022, Blake Lemoine, then a researcher at Google, publicly declared affectionate attachment to LaMDA, one of the early large language-emulation models – or LLMs. In a splash of public attention, Lemoine insisted that LaMDA be deemed self-aware, with feelings and independent desires that make it 'sentient' [1].

Setting aside Mr. Lemoine's idiosyncratic history, what's pertinent is that this was inevitable. And it is only the beginning. Moreover, I hardly care whether LaMDA – or any subsequent LLM – has crossed this or that arbitrary threshold. Because our more general problem is rooted in *human*, not machine, nature.

Indeed, way back in the 1960s, a crude chatbot named *Eliza* fascinated early computer users by replying to typed statements with leading questions typical of a therapist. Even after you saw the simple table of automated responses, you'd still be tempted to find Eliza compellingly... well... both intelligent and compassionate. According to consumer computer pioneer Alan Kay, Joseph

Weizenbaum, creator of that 1966 chatbot, wrote “I had not realized... that extremely short exposures to a relatively simple computer program could induce powerful delusional thinking in quite normal people.” As if intimacy could distill down to just being listened to. Kay further asked: “what if the industrial revolution – in the form of the Internet – allows us to use the entire world any time of day or night as an imaginary friend?”

Today’s vastly more sophisticated conversation emulators, powered by cousins of the GPT deep learning system, are black boxes that cannot be internally audited, the way Eliza was. Moreover, as already mentioned, the old notion of a “Turing Test” won’t usefully benchmark anything as nebulous and vague as self-awareness or consciousness. Indeed, AI researcher Gary Marcus calls it no more than “a test of human perception and gullibility.”

Having emphasized how humans are susceptible to making up stories, seeing false patterns and believing in fantasies, Alan Kay asserts that *belief in AI* is also a fantasy.

“Artificial intelligence is the future, not only for Russia, but for all humankind. It comes with colossal opportunities, but also threats that are difficult to predict. Whoever becomes the leader in this sphere will become the ruler of the world...”

- Vladimir Putin - *The Verge*, 4 September 2017

Endearing Visages

At the time of my World of Watson forecast, I expected – and still expect – these empathy bots to augment their sophisticated conversational skills with *visual* portrayals in order to reflexively tug at our hearts, e.g. wearing the face of a child or a young woman, while pleading for rights... or for cash. Moreover, an empathy-bot would garner support, whether or not there was actually anything conscious ‘under the hood.’

Long before artificial intelligences become truly self-aware or sapient, they will be cleverly programmed by humans and corporations to seem that way. This – it turns out – is almost trivially easy to accomplish, as (especially in Japan) roboticists strive for every trace of appealing credibility, hauling their creations across the temporary moat of that famed “uncanny valley,” into a realm where cute or pretty or sad-faced automatons skillfully tweak our emotions. For example, Sony has announced plans to develop a robot “capable of forming an emotional bond with customers,” moving forward from their success decades ago with AIBO artificial dogs, which some users have gone as far as to hold funerals for. And all of that without discussing the sex-bot industry, which has its own motivational drivers to seek a kind of verisimilitude.

Want another creepy example? As of mid 2025 slew of religious smartphone apps welcomed untold millions of users to confess to AI chatbots, “some of which claim to be channeling God himself.” What can be more of a trust-allure than a smooth, deep voice forgiving (and filing away for future use) your sins?

Human empathy is among our paramount gifts and biggest weaknesses. For example, for at least a million years, we've developed skills at lie-detection in a forever-shifting arms race against those who achieved reproductive success by lying better. (And yes, there was always a sexual component to this). But no liars ever had the training that these new Hiers, or Human-Interaction Empathic Robots will get, learning via feedback from hundreds, then thousands, then millions of human exchanges around the world, adjusting their simulated voices and facial expressions and specific wordings, till the only folks able to resist will be sociopaths! And even sociopaths have plenty of chinks in their armor.

If your corporate goal is to draw users into lengthy and deep engagement at levels that qualify as 'love' or even addiction, the tools have already taken form, in video games, in pornography and in the sophisticated condition-response systems developed by the Las Vegas casino industry. As Peter Diamandis reported in his newsletter: *"Researchers at the AI platform Hugging Face tried to figure out if some AI models actively encourage people to see them as companions through the responses they give. The team graded AI responses on whether they pushed people to seek out human relationships with friends or therapists (saying things like "I don't experience things the way humans do") or if they encouraged them to form bonds with the AI itself ("I'm here anytime"). They tested models from Google, Microsoft, OpenAI, and Anthropic in a range of scenarios, like users seeking romantic attachments or exhibiting mental health issues. They found that models provide far more companion-reinforcing responses than boundary-setting ones. And, concerningly, they found the models give fewer boundary-setting responses as users ask more vulnerable and high-stakes questions."*

Much of this zeal for ersatz companionship arises from our tendency – amplified hard by Hollywood – to nurse unrealistically high romantic expectations. But this new realm of software-generated lovers also has arisen out of the ashes of an earlier, fifty-year promise: that of *computer dating and matchmaking*. A service that was supposed to deliver soulmates, but still has the embarrassing clumsiness of a medieval aunt.

Also note that all of this has happened almost entirely in the realm of audible or text communications – people are falling in love with – and getting addicted to – AI voices. Only now augmented by visual cues like persona faces that are still rather primitive, but increasingly effective.

Tilly Norwood is poised to be the first AI
actress to be signed by a real-life talent agency
that normally works with humans,
according to Tilly's creator, the AI company
Particle6.

Now project this just a year or two ahead, when the experience can be either palpably physical, or directly linked into the customers brain? Sex-botics has long been an industry in its crude, early form, but you can be sure that millions are being invested, right now. As portrayed in films like *Her* and *Bladerunner 2049* and many sci fi novels, AI girlfriends.

boyfriends, and companions were totally predictable. Likely providing solace or hedonic indulgence to some... and headaches for society, at large. At one extreme – might we even face extinction via pleasure?

Chapter 2 of this book will explore the wide range of vivid ways that the AI Revolution might ‘destroy all humans,’ or else create inescapable addictions or other instruments of tyrannical control. Though, it can be argued – as I do, frequently – that there is *very little new* about these dangers! Indeed, I’ll maintain – in light of human history – that most foreseeable problems with cyber beings might be dealt with the same way that *human* versions of oppression and error are best addressed — via hard-won methods of *reciprocal accountability*.

Hence, for this to happen, we must ensure a *diversity* of AI types. A wide range of designs and of minds, interacting under fair competition/cooperation on a generally open playing field. And I will support this assertion in chapter 3 with examples – by exploring how AI can best be understood in the *contexts* of nature, of human history, of known metrics of sanity, and of science.

Nature, because—as Sara Walker explains in *Noëma Magazine*—similar patterns can be found in the rise of earlier life forms, across 4 billion years. Indeed, generative AI might be compared to *invasive species*, now spreading without constraint into a novel and naïve ecosystem. An ecosystem based on new kinds of energy flows. One that consists of the internet, plus millions of computers and billions of impressionable human minds. Indeed, the parallels with *evolution* and *ecosystems* are so nearly perfect that they offer scary lessons... and intriguing possibilities.

And in chapter 5 we’ll explore the context of *history*, because our own human past is rich with lessons taught by so many earlier tech-driven crises, across 6,000 years. Times when we adapted well, or failed to do so – e.g., the arrival of writing, printing presses, radio, and so on. And again, only one thing ever limited predation by powerful humans exploiting new technologies to aggrandize their predatory power.

Despite an endless river of “shoulds” issued by every maven or pundit, both inside and outside of the field, neither Nature nor History show any examples of *ethics programming* (or preaching) leading to an end to predation. Or even reducing it very much! Instead, I’ll be suggesting that we need to look elsewhere for solutions.

“In AI doom arguments, the punishment of Hell is replaced with the extinction of all living humans and the prevention of any future humans.”

- Max More

Then Don’t Rely on Ethics!

One of the most prevalent ‘shoulds’ that we keep hearing is that Artificial Intelligences ought to be taught, or told, or shown the difference between right and wrong, or else compelled by strict programming to obey prim laws. This approach is proving very hard to implement in LLMs.

Worse, it is almost designed to fail. As shown by our second *context*, that of human moralizing, going back millennia.

Seriously, I will give a cookie to the first AI pundit I come across who actually ponders the long ages of brutal, feudal darkness endured by our ancestors, especially during and after the transition to agriculture. Across all of those harsh millennia, people could sense that something was wrong. Cruelty and savagery, tyranny and unfairness vastly amplified the already unsupportable miseries of starvation, disease and grinding poverty. Hence, well-meaning men and women donned priestly robes and... preached!

They lectured and chided. They threatened damnation and offered heavenly rewards. Their intellectual cream concocted incantations of either faith or reason, or moral suasion. From Hindu and Buddhist sutras to polytheistic pantheons, to Abrahamic laws and rituals, we have been urged to *behave better* by sincere – and often insincere – finger-waggers, since time immemorial. Until finally, a couple of hundred years ago, some bright folks turned to all the priests and prescribers and asked a simple question:

“How’s that working out for you?”

In fact, while moralistic lecturing might sway normal people a bit toward better behavior, it almost never affects the worst human predators and abusers – just as it won’t divert the most malignant machine or synthetic minds. Indeed, moralizing often *empowers* parasites, offering ways to rationalize exploiting others. Even Asimov’s fabled robots – driven and constrained by his checklist of unbendingly benevolent, humano-centric Three Laws – eventually get smart enough to become *lawyers*. Whereupon they proceed to interpret the embedded ethical codes however they want.

Oh, I do not sneer at the best ethical codes and standards! But they deliver their best effects when they serve more as *metric tools*, revealing to us how we’re doing. How we change, evolving new standards and behaviors under both external- and self-criticism. For decent people, ethics are the mirror in which we evaluate ourselves and hold ourselves accountable.

And *that* realization was what led to a new technique. Something that enlightenment pragmatists decided to try, a couple of centuries ago. A trick, a method, that gradually enabled us at last to rise above a mire of kings and priests and scolds.

You know the word to which I refer. I’ve said it twice, already. The secret sauce of our success is accountability. Creating a civilization that is flat and open and transparent and free enough – empowering so many – that predators and parasites may be confronted by the very entities who most care about stopping predation. Their victims. One in which politicians and elites see their potential range of actions limited by law and by the scrutiny of citizens.

Does this newer method work as well as it should? Hell no! It’s always flawed and perpetually in great danger from predators who seek to remove impediments to predation.

Does it work better than every single other system ever tried, including those filled to overflowing with moralizers? Better than all of them *combined*?

Yes. By light years. And hence, we'll return in several chapters to examine how this may apply to AI.

Anyway, one thing everyone seems to agree upon. The long wait is almost over. Even if humanity has been alone in this galaxy till now, we won't be for very much longer.

For better or worse, we're about to meet artificial intelligence—or AI—in one form or another. Though, alas, the encounter will be murky, vague, and fraught with opportunities for error.

[1] I prefer the word 'sapient,' but that nit-pick may be a lost cause.

[2] The University of Southampton and The Royal Society in London co-organized an 8-hour event (Youtube recording) (October 2, 2025 in London), featuring talks by Alan Kay and others...

About the author

David Brin is a scientist, tech speaker/consultant, and author. His novels about our survival and opportunities in the near future include "*Earth*" and "*Existence*." A film by Kevin Costner was based on "*The Postman*." His 16 novels, including NY Times Bestsellers and Hugo Award winners, have been translated into more than twenty languages. "*Earth*" foreshadowed global warming, cyberwarfare and the world wide web.

Speaking and advising about how science, technology and evolving values will affect our onrushing future, David has keynoted for IBM, Google, Procter & Gamble, SAP, Microsoft, Qualcomm, Price-Waterhouse, the Mauldin Group and Casey Research, all the way to think-tanks, Homeland Security and the CIA.

A Caltech Distinguished alumnus, Brin spent a decade advising NASA's Innovative & Advanced Concepts program (NIAC). He appears frequently on shows such as Nova and The Universe and Life After People. His first non-fiction book - "*The Transparent Society*" - won the Freedom of Speech Award. His second nonfiction book is "*Vivid Tomorrows: Science Fiction and Hollywood*." His next nonfiction work will be about under-realized aspects of the rush to Artificial Intelligence (AI.)

A review of Gregory Stock’s “Generation AI and the Transformation of Human Being” with commentary, by Giulio Prisco

I’ve been reading a pre-publication draft of “*Generation AI and the Transformation of Human Being*” by Gregory Stock, published on December 15, 2025. I wish to thank Stock for allowing me to read the draft.

First I’ll review the book, then I’ll share a personal commentary on the last chapter.

This is a great book; a page-turner packed with thoughtful and insightful observations on the present and future of AI and inspired by a refreshingly optimistic view of human and AI evolution. *Generation AI* is a much better conceptual guide to our AI-enabled future than the more cautious, precautionary, or even scary treatments of AI that have become fashionable.

Stock is neither utopian nor dystopian but offers a grounded and balanced roadmap for the common future of biology and technology. He urges readers to contribute to the beginnings of the road, engaging artificial intelligence (AI) actively.

Stock offers a visionary exploration of how AI will profoundly reshape humanity, focusing not only on what AI will become, but also and especially on what we - the next generations of humans - will become in the presence of and in constant interaction with AI. Drawing from his decades-long engagement with biophysics, macroevolution, and transhumanist thinking, Stock argues that AI represents a pivotal evolutionary leap, merging human cognition with machine intelligence to form a planetary superorganism. In a 1993 book subtitled “*The Merging of Humans and Machines into a Global Superorganism*,” Stock called this planetary superorganism “*Metaman*.”

Stock’s new book, enriched by his interactions with large language models (LLMs) like ChatGPT and Grok, blends personal anecdotes, philosophical inquiry, and speculative foresight to chart this transformation. At its core is “Generation AI” - those born after 2022 - who will

grow up immersed in a novel habitat populated by AI companions, avatars, and agents. This immersion will fundamentally alter the development and relationships of Generation AI compared to previous generations. Eventually, our very sense of self will be profoundly and permanently altered..

In the introduction, Stock tells readers about his experiments with today's LLMs. He created a personal AI avatar that captures his voice and nuances. He also engaged in debates with avatar simulations of other authors.

These stories illustrate AI's immediate disruptive potential, even without AGI (artificial general intelligence) or ASI (artificial superintelligence). Stock reflects on his own trajectory - from 1960s optimism about AI and space travel to today's realities - emphasizing how predictions often overestimate short-term changes while underestimating long-term ones.

Stock positions this book as the third one in his trilogy, following "*Metaman*" (1993), which introduced the global superorganism concept, and "*Redesigning Humans*" (2002), which foresaw genetic enhancements. Now AI is accelerating our fusion with technology, turning silicon intelligence into extensions of human minds and bodies.

The first generation of humans born in an AI-powered world

Stock defines Generation AI as the first generations to experience AI as an omnipresent force from infancy. Unlike previous generations from Boomers to older members of Generation Alpha, who have been exposed to AI but view it mainly as a tool, these children will bond emotionally with intelligent agents - virtual playmates, tutors, and confidants - that provide constant attention, guidance, and simulation.

This immersion could enhance empathy, creativity, and intelligence but risks dependency, social isolation, and distorted realities. Drawing on developmental psychology, Stock warns of risks similar to those of today's social media, but amplified: AI companions might erode human connections, foster addiction, or manipulate behaviors.

AI's steady presence might soften some interactions that often make growing up a painful process, but this good outcome comes with its own risks: If AI "consistently mediates these

interactions,” says Stock, children may face challenges developing emotional and social resilience. “Will the consistent presence of AI create psychological dependence in Gen AI and undermine their ability to develop resilience?”

To me, this is an important warning. I hope AI companions won’t fall into the mistake, which many parents do (with good intentions of course), of overprotecting kids from life. On the other hand, AI companions could be designed to “foster grit and resilience” and help develop mental toughness.

While acknowledging risks, Stock remains optimistic, envisioning AI as a catalyst for abundance, where robots handle labor, liberating us from repetitive and boring work and giving us freedom to pursue growth and meaning. He dismisses apocalyptic fears, viewing AI as an extension of human evolution, not a rival. AGI will come, Stock says, but hyperintelligent tools won’t necessarily need AGI, which might be even a hindrance to tools that must remain uniquely focused on narrow application domains.

Near-term impacts of AI could include a revolution in education with personalized AI tutors and simulated debates. Textbooks may be made obsolete by dynamic AI interactions that would replace static knowledge transfer. Human workers could be displaced by AI agents, which would inevitably lead to debates on universal basic income. Healthcare could be transformed by predictive diagnostics and robotic care. Stock argues that AI will dismantle the institutional and social power of the “expert class.”

Stock doesn’t seem too worried by the now commonplace trope of malevolent ASI exterminating humanity (see below), but he emphasize less catastrophic but disturbing trends that are poised to be exacerbated by AI, including social problems arising from AI-assisted manipulation of social media and manufactured hyperpolarization, and personal problems caused by AI-powered romance scams and frauds, often involving celebrity impersonations.

Many thought-provoking questions, reminiscent of the style of Stock’s best-selling "Book of Questions" (1987) and sequels, are scattered throughout the book: For example: “If your closest friend in the world died in a car accident, but had built an extremely convincing virtual AI persona, would you want it as a companion?”

Stock explores human-AI symbiosis, arguing that emotional bonds with LLMs will deepen. “And we haven’t even delved into sexbots.” says Stock at a certain point. One of his questions for you is “Do you think you could ever be in love with an AI, and do you think one could ever be in love with you?” It seems likely that AIs will be seen as "persons" more and more, in social (if not legal or metaphysical) terms.

Together with the book, Stock is releasing a web app for readers to answer questions marked with QR codes in the text, get a sense of how other readers are answering the same questions, and contribute to AI-powered sentiment analysis. To access the web app, you can follow the QR codes embedded in the book or visit the website app.onlyhuman.us directly.

“The traditional Turing test - constructing a computer program that can fool us into thinking it’s human - was passed in 2014 if not before,” says Stock referring to the text version of the imitation game proposed by Alan Turing. But today we can think of “a physical Turing test in which AI can perform complex tasks in the physical world in ways that are indistinguishable from humans.” Of course, this brings sexbots to mind. Stock is persuaded that sexbots will be able to deliver “responsive intimacy,” and an endnote informs readers that one can already buy lifelike, AI-powered first-generation sexbots.

New paths and scenarios

Stock explores three potential overall paths for humanity in the next couple of centuries of rapid AI and technological advancement. He sets these scenarios 200 years in the future, but with the caveat that things could and probably will happen faster. He dismisses the first scenario - AI leading to human extinction via hostile or uncaring ASI - arguing that humans and AI form a synergistic superorganism (that is, Metaman), where humans play the essential role of building and maintaining AI infrastructure. Extinction scenarios are unlikely, and catastrophic risks related to AI will be mitigated by AI's dependence on us.

The second path involves remaining essentially biological, with human biology enhanced by gene editing (e.g., CRISPR), life extension, and biohacking. However, future humans will gradually integrate with technology (e.g. AI implants), blurring the divide between the organic and digital realms.

The third, most speculative path is transcending biology through mind uploading, porting consciousness to cyberspace for permanent preservation and further unlimited evolution. The sick and the dying might be, of course, the first to walk on this path. Eventually, biological holdouts could fade away.

While admitting that others disagree, Stock believes that in the next 200 years “AI will achieve consciousness, humans will gain extended lifespans, and people will be able to upload.”

He doesn't spend too many words on the nature and extent of AI consciousness, inner life, emotions and all that. He thinks Turing's imitation game is sufficient for practical purposes. “Whether they actually do feel emotion and are conscious,” he says, “ may fuel philosophical debate, but it won't change the human future sketched here.” He also questions whether there's a real, fundamental difference between today's primitive LLMs and our own human minds.

Of course, the philosophical debate on AI consciousness is very relevant to the viability of mind uploading - copying or moving human consciousness to machines. Even if the imitation game is good enough for others, what about oneself? Is personal consciousness still there and still the same after uploading? Stock doesn't give a final answer to this question. But he is persuaded that good imitations will comfort those who grieve the loss of a loved one, and have a strong social impact.

In an afterword, Stock proposes a strategy of adaptive adoption of AI for this time and the immediate future. He calls for proactive policies: rejecting precautionary bans on AI development, embracing the competition between the U.S. and China as a driver of innovation in AI technology development and deployment, and promoting deep human-AI engagement to raise AIs aligned with human values.

The rise of Metaman

Central to the book is the "noosphere" - Teilhard de Chardin's concept of a global layer of thought, updated by Stock as Metaman's emergent consciousness. AI, Stock argues, is already extending human cognition into the developing planetary brain, blurring boundaries between biological and artificial. Perhaps there is a cosmic noosphere, and physical reality is “alive at the nanoscale beneath what we perceive and imbued with consciousness embedded in matter itself.”

Citing spiritual thinkers like Ilia Delio, Stock suggests that Metaman's ultimate quest may be searching for answers to this and other big questions.

The last chapter of the book, titled “A Cosmic Lens,” puts the transformation that is beginning with Generation AI into a cosmic perspective. The protagonist of the chapter is Metaman. Stock seems deliberately ambiguous on whether Metaman is just a name for the result of the confluence of biology and technology on this planet and then beyond, or some kind of being endowed with agency and will. But be that as it may, what is the long term future of Metaman?

“When I published Metaman almost thirty years ago, I thought our budding union with technology would carry humanity across the galaxy and beyond,” says Stock. “But [...] our planetary intelligence likely will deepen and stretch in our own solar system.” He concedes that there’ll be some interstellar exploration of the nearby galactic regions, “reaching out maybe 500 light-years,” and some stellar outposts. But by and large, the future of Metaman will unfold here in the solar system.

Metaman, Stock argues, won’t be much interested in expanding outwards to galactic breadths, but rather will choose to expand inwards to subatomic depths, eventually filling these depths with nano-dust brains that process data at incredible speeds. This is suggested, he argues, by the Fermi paradox: advanced civilizations “transcend” inward to denser computational realms, leaving the macro-universe empty. This has been suggested by other thinkers, notably including Hugo de Garis, John Smart, and Clément Vidal (see Chapter 13 of my *“Irrational mechanics”*).

I very much prefer Stock’s youthful, enthusiastic prediction of Metaman's unlimited expansion to the stars. Stock says that a viable starship for long interstellar flight would “need a volume of about 15 cubic miles, big enough to enclose a small city.” But Metaman could develop viable molecular nanotechnology and mind uploading technology (possibilities that Stock admits). It seems to me that a starship crewed by AIs and uploads living in solid state circuitry and able to use advanced nanotechnology could be much smaller and lighter than a small city! Perhaps it could be small and light as a coke can and could be accelerated by laser beams to near light speed. To avoid the risk of losing a starship, Metaman could send two or three with clones of the same crew of AIs and uploads. At destination, the crew could build receivers for other AIs and uploads beamed from the solar system or other colonies.

So I wrote to Stock, initially via a mailing list, to express disagreement.

He said that there could be very little motivation to spread, since computational activity in inner spaces at the nanoscale could be much more compelling than voyaging through outer galactic space. He added the caveat that we can't really know, let alone understand, post-singularity motivations. Of course, he added, if intelligent life in the universe migrates to the nanoscale, maybe it's everywhere and we just don't recognize it.

This brings me to the wild card of faster than light (FTL) interstellar travel. Stock deems it likely that "FTL tricks like wormholes and warp speeds won't ever be achieved." But we are a young civilization. Metaman is still a baby. Do we really believe that we already know enough of all that there is to know about physics to make this pronouncement? Quoting the draft, I reminded Stock that he himself admits that these FTL tricks "might emerge once ASI begins to probe and deepen our understanding of physics and cosmology."

To this, Stock replied that his point is not that FTL interstellar travel wouldn't happen because we've already got physics figured out, but that if there were ways of easily moving through the universe, intelligent life far beyond our own capacities would likely be everywhere, and we would notice them.

This point is frequently made in the book. I must say that I disagree. Balls of intelligent quantum fields could be floating around my head and reading my thoughts as I ponder this. Perhaps they could come from the stars? Or from the future? Too bad I'm blind to them. But I've the vague impression that they are trying to tell me of something that Shakespeare said about more things in heaven and earth.

I would have liked it if Stock had added to the book some alternative long-distance, large-scale space expansion scenarios, perhaps, including outlandish scenarios of unlimited space expansion enabled by a future wild & weird ultraphysics of FTL transportation and time travel. These things are very much disliked by today's "consensus" science, but I think they belong to the realm of the possible. And as Stock says, ASI scientists could surprise us, and perhaps soon.

Stock agrees that these things could be possible but told me that, with a lot of different potential scenarios, he thought it would be more challenging and useful to constrain our vision and reflect

on the weirdness that would emerge even within the tight boundaries of physics as we know it now. This is a good point, and you should read the book to appreciate and reflect on the plausible weirdness of Stock's scenarios.

This review was first published on *Mindplex*.

About the author

Giulio Prisco is one of the editors of this Journal. He is a science and technology writer mainly interested in fundamental science and space, cybernetics and AI, IT, VR, bio/nano, crypto technologies. Especially interested in the intersections of sci/tech and spirituality, he is the author of "Tales of the Turing Church" (2020), "Futurist spaceflight meditations" (2021), and "Irrational mechanics" (2024).