"Freedom of Spirit in Research" in an Age of Deepening Division

Freedom of Spirit as Guiding Light Amid Deepening Divisions

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Summary

In an age of sharp division, social media and Artificial Intelligence (AI) are turning digital platforms into echo chambers where people get more of what they already think. Algorithms reward extreme voices, amplifying emotional content to boost engagement, inflaming mistrust, and deepening polarization [1],[2]. Research is affected too, with researchers trapped in cycles of fear, reputation concerns, and self-censorship. Amid this darkness, freedom of spirit serves as a guiding light for inquiry in a divided research landscape.

Freedom of spirit is under constant pressure to uphold ethics and integrity in research. This essay argues that this interior liberty under pressure is necessary for ethical research serving the common good. It is necessary for a constructive shared web of human thoughts and relationships, a noosphere [3],[4]. Pressures like funding overreach, legal threats, data falsification, and state secrecy are constantly threatening the freedom of spirit in research. When freedom of spirit collapses under such pressures, truth itself becomes negotiable, public trust in knowledge withers, and the very conditions for responsible science and shared moral meaning are placed at risk.

To safeguard research from descending into a force for division, the essay frames freedom of spirit as freedom from overreach and freedom for sharing. It builds on three Teilhardian pillars: the noosphere's "law of complexity-consciousness" fueling collective growth; union-differentiée bridging unity and diversity; and a critically sustained inner freedom that resists pressure while upholding integrity.

Through these pillars, the essay examines four significant challenges: legal intimidation, funding overreach, data falsification, and state secrecy. The essay uses documented cases to illustrate how these forces erode trust and widen divisions. It then turns to AI ethics as the last mile where these issues converge, offering potential to overcome divisions in an AI-driven world. Finally, the essay proposes a Teilhardian freedom charter with practical commitments to sustain freedom of inquiry, keeping honest research alive amid mistrust and division.

1. Introduction

A problem of deepening division. Today's information space is shaped by social media and AI systems that behave less like a town square and more like echo chambers. Algorithmic feeds rely on charged emotional content to keep users engaged, which results in amplifying outrage and polarisation [1]. Evidence from Facebook's own reviews in 2018 shows how tweaks designed to boost interaction further fueled misinformation and toxic speech instead of dialogue [5]. Tools meant to connect us led to the deepening of mistrust and division.

Researchers do not operate outside these settings. They work inside institutions shaped by the same public opinion, financial interests, and political pressures. Teams that expose bias in powerful systems may face internal pressures to prioritize profit over safety. Others simply avoid these sensitive topics to protect their careers. In this setting, freedom of spirit is not an abstract philosophical luxury. It is a practical necessity that can determine whether evidence of harm stays buried or is finally brought to light [6]. For my own research at the intersection of AI and ethics, this necessitates a daily discipline of interior freedom, especially when frank analysis may unsettle institutional expectations.

Teilhard's noosphere and freedom of spirit. Twentieth-century philosopher Pierre Teilhard de Chardin envisioned humanity as growing within a *noosphere*, a globe-spanning layer of intellect [3]. His "law of complexity-consciousness" links increasing complexity with deeper interiority and freedom for reflection [3]. In today's digital age, global data networks and AI systems are one technological expression of this noosphere. Teilhard's experience of critical fidelity under institutional limits shows how a critically sustained inner freedom can endure pressure [7].

When research is free in spirit, diverse disciplines and perspectives can form what Teilhard calls a union-differentiée: a differentiated union in which distinct voices strengthen rather than erase one another [4]. Freedom of spirit thus names both freedom from overreach by legal, financial, or political forces and freedom for honest sharing within the noosphere. When that freedom is weakened by intimidation, donor pressure, data manipulation, or secrecy, inquiry becomes half-lit, and division deepens.

Question and roadmap. This essay asks how Teilhard's visions safeguard freedom of spirit in research. It sketches his key ideas as a framework, analyses the challenges that threaten this freedom, situates the challenges in AI ethics and my research where they converge, and concludes by proposing solutions as a Teilhardian charter with strategies to safeguard freedom of spirit in an age of division.

2. Framework: A Teilhardian Vision for Freedom of Spirit

For a profound discussion of freedom of spirit in research, we need a framework that is intellectually robust and deeply practical. As a Jesuit priest and scientist, Pierre Teilhard de Chardin provides exactly that. We draw on three of his key ideas as pillars for understanding freedom of spirit in research today. These pillars are the noosphere and its *law of complexity-consciousness*; the principle of *union-differentiée*; and a lived practice of critical fidelity under pressure. These foundational pillars gave Teilhard himself an interior freedom that resisted compromise under pressure. They remind us that research is never a purely technical enterprise. Freedom of spirit must be a part of it for knowledge to serve unity rather than division.

2.1 Noosphere and the Law of Complexity-Consciousness

Teilhard describes evolution as more than a physical process. It is a journey toward greater complexity and deeper consciousness [3]. As matter organizes into more intricate forms, life gains new interior dimensions. That is awareness, thought, and the capacity for choice. When complexity reaches a certain high level, human thinking emerges and spreads out. This forms what Teilhard calls the noosphere, like a layer of thought surrounding the Earth. This layer is made from all accumulated knowledge, ideas, and relationships. It is hard not to recognize the outline of this noosphere in today's internet and AI-

powered information networks. Our digital infrastructures manifest this in not only storing information but also interlinking minds and shaping our shared reality.

Teilhard goes further to argue that this convergence of minds carries a moral significance, too. His concern was never just *how much* humanity can connect, but *to what end* are we connecting? Are we bringing forth a noosphere that tends toward greater empathy and shared truth, or one that frays into fragmentation and confusion? He believed that every increase in connectivity ought to be matched by a rise in conscience, morality, and love [3]. In this sense, research is not always ethically neutral. Every study, every dataset, every AI model adds a spark to the great fire of collective understanding. This can fuel the noosphere for better with greater freedom of spirit or for worse into deeper divisions.

2.2 Union-differentiée: Unity in Diversity

We often imagine "unity" as a process of fusion where individual identities melt into a uniform whole. Teilhard argues the opposite. In any life-giving union, members become *more* themselves as they enter deeper into relationships with others [4]. True unity does not erase differences, it personalizes them. Differences turn from barriers into bridges, which allow cooperation without the necessity of conformity.

This principle also holds in healthy research communities. A good research team is not one in which everyone thinks alike. It is the one in which diverse perspectives interlock together in a shared pursuit of truth. It thrives on freedom of spirit that is coupled with ethics. Freedom of spirit lets us ask challenging questions and ethics keeps them responsible and constructive.

This insight speaks directly to our modern research dilemmas. Many institutions quietly worry that encouraging ethical dissent or critical debate will slow down innovation or fracture team unity. Researchers fall into the temptation of silencing critical questions and downplaying ethical concerns. Yet from a Teilhardian view, silencing tensions only drives them underground, undermining true unity. It hollows out the research community and prevents the maturity of a constructive plurality. Constructive plurality must allow members to face their differences with mature integrity. The alternative is a risk of polarization and division from superficial conformity.

At the scale of the noosphere, *union-differentiée* offers an antidote to this polarization. It offers a "structured plurality" in which interdisciplinary and cultural differences contribute to a richer whole with no one losing an identity. Nurturing this kind of plurality requires deeper interior freedom and courage. Freedom of spirit gives researchers the courage to remain authentic and open to critique even when honest friction arises. The result is that conflicts are dialed down into creative tensions, and research can advance without collapsing into relativism or fear.

2.3 Freedom of Spirit as Critical Fidelity in Research

Teilhard's own life is a living testament to freedom of spirit in research. His role as a Jesuit and scientist led to a creative tension between his Jesuit vocation and his research. He was restricted several times by his superiors from publishing theological reflections that ventured beyond orthodox boundaries. Academic authorities in his scientific circle also viewed some of his ideas with skepticism. Yet Teilhard continued to work in a spirit of critical fidelity, without falling into mere resignation. Freedom of spirit channeled his resilience into a steady source of light for himself and others in the times of division [7].

Teilhard exemplified what we might call critical fidelity. He neither idolized rebellion nor practiced blind submission. He exercised a critically sustained inner freedom, guided by vigilance and creative patience at the service of others. This ideal still has a sharp relevance for researchers today in fields like AI ethics. It calls for freedom from the anxieties of status, funding, and legal retribution. It imparts freedom of speaking clearly about bias and harm when conscience demands. Such critical fidelity is a powerful strength that can be harnessed to ethical ends.

In Teilhard's living example, we see that freedom of spirit in research has both a practical and an ethical dimension. He remained faithful to his scientific vocation and to his Catholic Church. He welcomed

critique without betraying his core insights. In his hands, critical fidelity grounded in freedom of spirit became an antidote to conflict amidst deepening division.

Taken together, Teilhard's ideas of critical fidelity, the noosphere's convergent vision, and the principle of union-differentiée give a firm foundation for how freedom of spirit shines as a guiding light for research. Teilhard's life and visions are a testament to freedom of spirit amidst division. In the next section, we turn this framework toward the contemporary challenges, the forces that threaten the light of inquiry.

3. Challenges to Freedom of Spirit in Research

This section examines four challenges that threaten freedom of spirit in research. These forces feed a vicious negative cycle. They turn creative disagreements into hostile division, eroding trust and impeding the progress of knowledge. We will see how each force widens the rifts where unity should prevail and clouds areas of inquiry that should be clear. Each of the forces presents two faces, an outer face of pressure wielded by institutions and states, and an inner face of pressure felt by individual researchers as fear or temptation. We will observe through actual cases how these forces have stifled researchers and darkened the noosphere.

3.1 Legal Intimidation and Its Impact

Legal intimidation can undermine freedom of spirit when those who speak the truth are threatened instead of getting protection. Legal tools intended for justice become weapons to muzzle scientists and whistleblowers. Lawsuits and sanctions become the very restrictions of freedom of spirit. This casts a long shadow on research bodies. Externally, powerful institutions may wield legal tools to guard their reputations at all costs. Internally, researchers police their own speech. This induces hesitation, self-censoring, and choosing safe topics to avoid provoking legal troubles.

One stark example comes from medicine. In Germany, anesthesiologist Joachim Boldt perpetrated one of the worst frauds in modern research, fabricating data in nearly 90 clinical studies [8]. Journal editors eventually retracted almost all of his papers. His work, however, had already corrupted the body of literature and patient care [8]. The Boldt case sent a loud and clear message on how costly it can be when warnings are delayed. More broadly, cases like this warn clinicians and journalists that challenging powerful interests can feel risky, even when it is necessary.

Frances Haugen's disclosures of Facebook findings underscore a similar dynamic in the digital domain. As a whistleblower, she took considerable legal and professional risks to bring internal research to light [6]. She disclosed research findings showing how algorithms were amplifying harmful and polarizing content [6]. This highlights how the powerful can easily weaponise legal tools to deter scrutiny. It is with this knowledge that many researchers refrain from asking questions that are simply too dangerous to ask. Such legal sieges poison the research environment and deepen divisions. Only robust freedom of spirit can rekindle the moral courage needed to face down these threats and turn creative tensions into opportunities for collaboration.

3.2 Funding Overreach and Donor Pressure

If legal intimidation casts a shadow over those who speak out, funding overreach bends the trajectory of research toward what best serves the funders' interests. Research funding under the freedom of spirit is the lifeblood of research. When funding overreaches, the pursuit of truth gets quietly strangled by donor interests. Without freedom of spirit, studies are easily designed to please sponsors, and inconvenient results get buried. The methodologies are also tweaked to fit a preferred narrative. Without the counterbalance of freedom of spirit, researchers and institutions can become beholden to the hand that feeds them. Over time, research tells only the stories that funders want to hear. The little light of honest inquiry that was left dims under a haze of funding.

The pharmaceutical industry offers cautionary tales. In 2012, GlaxoSmithKline (GSK) pleaded guilty to criminal fraud [9]. They paid a record 3 billion U.S. dollars fine for promoting drugs for unapproved uses and for concealing negative trial results [9]. In the GSK case, unfavorable studies were delayed or downplayed while the positive spin continued in marketing [9]. Another famous example is Theranos, a Silicon Valley startup once valued in the billions of U.S. dollars for its supposedly groundbreaking blood-testing technology [10]. Theranos's leaders cultivated a culture of extreme secrecy and hype with almost no peer-reviewed evidence. Critics encountered strong pushback from the company's leadership [10]. Only after the company's collapse did it become clear that many of its vaunted tests had never been scientifically validated. In both stories, money and image controlled what could and could not be said. This was done at a terrible cost to patients and the public trust. Freedom of spirit was smothered, and the common good suffered.

Such funding pressures have hardly disappeared. In another 2012 case, Abbott Laboratories paid 1.5 billion U.S. dollars to settle charges of illegally marketing a Depakote drug for off-label uses [11]. More recently, in 2025, nearly every U.S. state joined to hold Gilead Sciences accountable for allegedly bribing doctors to boost sales of its HIV medications. The company agreed to a 202 million U.S. dollars settlement rather than go to trial [12]. Once evidence is shaped by wealth rather than truth, only freedom of spirit stands between science and moral collapse. It means saying "no" to lucrative bias so that science can keep an honest voice rather than an echo of the highest bidders.

3.3 Data Falsification and Research Integrity

The falsification of data is another force that strikes at the very heart of research. When evidence itself is fabricated or distorted, the entire ecosystem of knowledge is shaken. False data propagates into publications and policies. This misinformation can continue misguiding other scientists and decision-makers even long after the fraud is exposed. Progress stalls as the research community chases phantoms. Data falsification is the most acute form of research corruption. It is a major threat to ethics and freedom of spirit. It is often a grim indicator of how other pressures can erode ethical integrity and freedom of spirit in research to its core. When scientists sacrifice truth itself, then research is at its tipping point. Conscience gets dulled, and the pursuit of knowledge gives way to the pursuit of influence and career. Research space gives way to misinformation and deeper divisions.

An infamous MMR-autism fiasco remains a constant reminder of this problem. A paper by Andrew Wakefield and colleagues in 1998 suggested a link between vaccines and autism in children [13]. Investigations later revealed egregious methodological flaws and even misconduct. Wakefield had undisclosed financial conflicts of interest and had misrepresented patients' clinical histories [13]. His license to practice medicine was revoked. The damage remained even after his paper was also retracted as fraudulent. Vaccine fears took root and led to hesitancy about immunization. It sparked rises in disease outbreaks that were avoidable. Misinformation had already gone far by the time the truth caught up. Public trust was so eroded that the myth of the "dangerous vaccine" persisted even after authorities refuted the claims. In this saga, freedom of spirit was compromised twice over. First, by the deceit of falsified data, and then by the hesitation or inability to correct the error swiftly and clearly.

These cases illustrate the dire consequences when freedom of spirit is lost. Falsified data find their way into practice and fuel public mistrust and deeper division. Researchers need a renewed sense of integrity. The bar of research can only be raised by researchers resolved to resist falsification and to uphold the freedom of spirit under pressure. Freedom of spirit is proven in those moments of temptation when researchers decide that honest failure is better than a fraudulent success.

3.4 State Secrecy and Geopolitics

State secrecy and geopolitical rivalry can cast another shadow over research. In the name of national security or political advantage. Authorities may restrict what scientists can study or publish. Classified projects and broad non-disclosure agreements create an environment where ethics become difficult to enforce. Transparency itself becomes scarce. Researchers end up deciding that certain topics are off-limits. Topics such as politically sensitive public health issues or defence applications fall behind in innovation. Freedom of spirit takes a hit when research inquiries encounter roadblocks of secrecy.

A striking illustration emerged with the investigation of the Pegasus spyware. In 2021, cybersecurity researchers from Amnesty International and Citizen Lab exposed how an Israeli software firm was used to hack the phones of journalists and public figures [14]. Their analysis showed how powerful surveillance technology could be deployed in secrecy against civil society targets, often under the broad banner of national security [14]. In such an atmosphere, those who shine light on unethical practices are treated as enemies of the state. The chilling effect on others is to refrain. Many will choose not to ask questions at all.

A Nature report from 2025 outlined how growing security concerns are reshaping science. Researchers in politically sensitive areas such as AI and public health describe a new terrain in which certain topics and collaborations feel too risky to pursue [15]. Instead of openly exploring these questions, some scientists avoid sensitive framings or international partnerships because of fears about political repercussions and career consequences [15]. On one side, governments tighten controls on sensitive topics and data. On the other side, individual researchers pre-emptively steer away from them. The result is shattered freedom of spirit. We find self-censorship and paranoia where open collaboration and critique should be. In such conditions, bad science can thrive when left unchecked, leading to further divisions.

These four forces of legal intimidation, funding pressure, data corruption, and secrecy are not abstract morality tales. They are real, contemporary pressures. They grow stronger whenever freedom of spirit grows weak. Figure 1 below summarises this movement from Teilhardian pillars through these four challenges to the AI-ethical distortions and remedies that the rest of the essay explores. In domains like artificial intelligence, where our noosphere is knit most tightly, these forces often converge and amplify one another. This makes the work of *AI ethics* a pivotal frontier for preserving freedom of spirit in research. It is to that frontier we now turn.

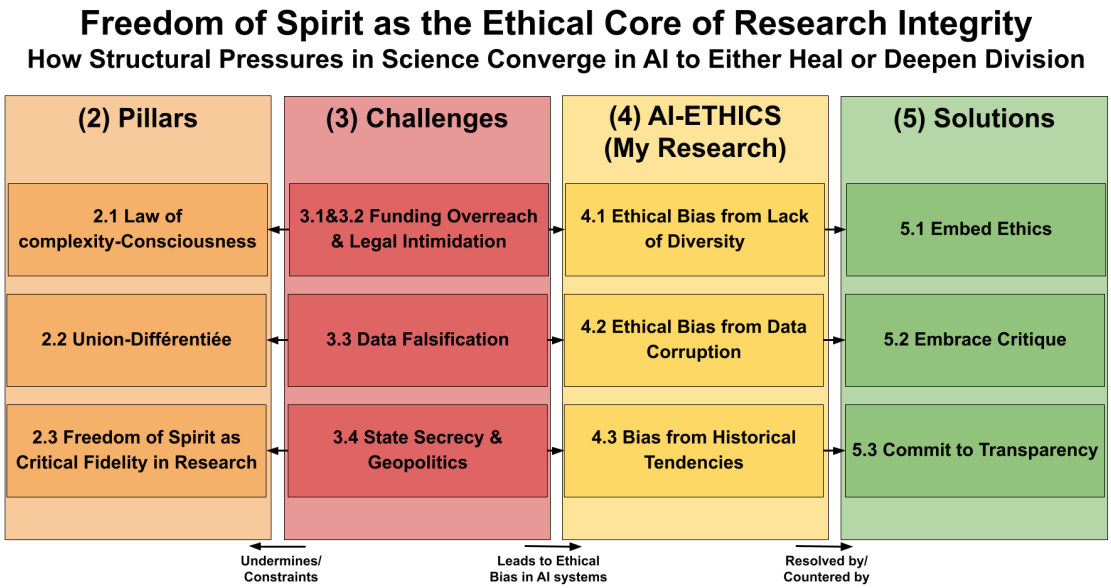

Figure 1: This diagram maps how Teilhardian pillars of research integrity are weakened by structural challenges, which converge in AI as visible forms of ethical bias. It then shows how targeted ethical practices counter these distortions, forming a practical freedom charter to restore integrity and resist deepening division.

4. AI Ethics and My Research: The Last Mile

This section situates the earlier challenges in the specific context of AI ethics and my research. Ethics in AI is not just a research topic among others. It holds a special place in the noosphere's future. AI algorithms and recommender systems now shape the decision-making process of vast numbers of people today [1],[2]. In Teilhard's terms, this is where complexity and consciousness meet most visibly [3]. Our digital world is a dense network of shared intelligence that was uncannily foreseen by

Teilhard's vision decades ago [4]. Ethics becomes critical in such a shared world. It becomes the determinant of technology that either unites or misleads and divides. Freedom of spirit is indispensable in this setting. Scientists must have the inner liberty to question bias and demand transparency. Researchers must insist on human values as a guide for technological progress. As Figure 1 suggests, AI ethics is the junction where these structural pressures on research surface as systematic biases in data, design, and deployment.

When researchers can enjoy interior freedom in research, their work illuminates the path of progress. Biases get exposed and innovation marches forward. But when fear of lawsuits, political backlash, and funding cuts takes over, darkness falls. Ethics is reduced to a decoration on a system driven by profit and power rather than the common good. Research loses the benefits of free and honest inquiry. We can always see the difference between the two instances. A free researcher names the inconvenient truth and helps set things right, whereas a constrained one stays silent and lets the system drift.

In this sense, AI ethics stands as the last mile where many of the noosphere's hopes and hazards converge. AI can become a force that enriches our collective mind and uplifts our shared humanity when freedom of spirit burns brightly. Whereas when that flame goes extinct, AI may instead magnify our worst biases and deepen our divisions. The challenges of this frontier call for more than technical fixes. They demand moral resolve. My research explores this challenge. That is how to incorporate ethical safeguards in AI solutions as protective measures, as shown in Figure 2. In the following section, we propose a set of solutions to safeguard the freedom of spirit in research. We propose a Teilhardian freedom charter that will safeguard research in the age of AI.

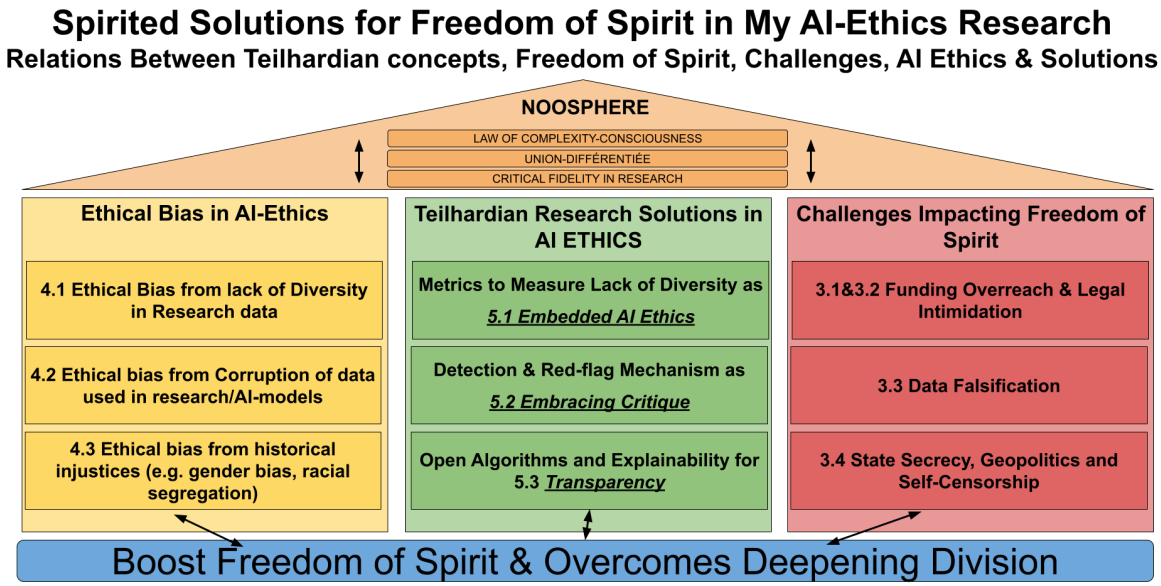

Figure 2: The diagram illustrates a top-down workflow guided by Teilhardian concepts like Noosphere and Union-Différentiée, where ethical AI biases (e.g., lack of diversity, data corruption) are addressed by research efforts (e.g., diversity metrics, open algorithms) that counter challenges (e.g., funding overreach, state secrecy), ultimately leading to boosted freedom of spirit and overcome divisions, with arrows indicating influences, addresses, and counters.

5. Teilhardian Freedom Charter: Spirited Research Solutions

In response to the challenges outlined, we propose a **Teilhardian freedom charter**, a collection of practical commitments to uplift freedom of spirit in research. These commitments deepen the "Teilhardian research solutions" of Figure 2, translating that workflow into everyday practices within labs, departments, and AI projects. Each commitment below targets one or more of the challenges discussed above. These commitments correspond to the "Solutions" column in Figure 1, directly countering the mapped challenges while safeguarding freedom of spirit in research. They offer a way to counter intimidation, overreach, corruption, or secrecy with an ethos of courage and integrity:

Embed ethics as a foundation in all research practice. Protecting the honesty of work has to be embedded deeply in every effort from the outset and not as an afterthought. Any safety and loyalty issues must be revealed transparently and promptly. Privacy contracts should solely defend actual confidential matters and not misconduct. They must not serve as shields for hiding misconduct. Making ethics non-negotiable sets a tone that truth comes before prestige or profit.

Embrace critique as a normal quality control and not as a personal attack. Research communities should encourage independent audits and open dialogue with peers and the public. Those affected by research outcomes ought to have their issues acknowledged and fixed when they raise them. Freedom of spirit thrives best in places where researchers and institutions draw lessons from criticism instead of instantly pushing them aside. Open critique is how science corrects itself and grows more robust.

Commit to transparency in methods and data. Researchers should strive to lay out their work process and evidence as openly as possible. This enables others to inspect and endorse the findings. It's crucial to outline the work's limitations and share enough information for effective external review. There must be reasonable accessibility even when full transparency isn't possible because of privacy or security. This spirit of transparency deters fraud and builds confidence within the noosphere that discoveries are for the common good.

Foster structured plurality in research governance. Differing views are an asset to research and not a liability. Teams handling ethics, fund review, and journal editorials need to incorporate individuals from assorted specialties and backgrounds. The voices of those who may bear the consequences of research must always be accounted for. Within labs and departments, junior researchers and whistleblowers should be appreciated for flagging risks and ethical concerns. Spreading responsibility across a pluralistic community makes freedom of spirit more than a private virtue of a few heroic individuals. Ethics and freedom of spirit become a common standard that everyone is expected to uphold.

When put into practice, these measures ensure that freedom of spirit becomes part of the everyday culture. A culture that lives by this charter will strengthen research ethics and better guard science against disinformation and distrust. In short, protecting the freedom of spirit in research helps transform our divided noosphere into a brighter, more truthful community of inquiry.

6. Conclusion

We began by drawing attention to an age of deepening division. We drew attention to social media and AI algorithms that amplify outrage and division. Against this backdrop, we introduced freedom of spirit as a safeguard against division. We used Teilhard's vision as a framework to examine freedom of spirit and challenges undermining it. We examined four concrete challenges that cast shadows over the freedom of the spirit in research. These included legal intimidation, funding overreach, data falsification, and state secrecy. We used cases from biomedicine to Big Tech to illustrate how these forces undermine trust and divide communities. We then highlighted AI ethics as a pivotal frontier where these challenges converge. We finally proposed a Teilhardian freedom charter with practical commitments to resist pressure and sustain honest inquiry.

Thus, freedom of spirit is not an optional luxury. It is the necessary interior safeguard of research from mistrust and division. It is the force that will transform echo chambers into forums of understanding, replacing fear with hope and insight. Freedom of spirit is the flame we must keep burning brightly to safeguard research in an age of deepening division. Following in Teilhard's footsteps, I intend to let this freedom of spirit guide my AI ethics research. I intend to embed ethical guardrails into the AI tools I help build so that they may strengthen defenses against the deepening divisions of our time.

References

1. W. J. Brady, K. McLoughlin, T. N. Doan, and M. J. Crockett, "How social learning amplifies moral outrage expression in online social networks," *Science Advances*, vol. 7, no. 33, Art. no. 34389534, Aug. 2021, doi: 10.1126/sciadv.abe5641.
2. W. J. Brady and M. J. Crockett, "How effective is online outrage?," *Trends in Cognitive Sciences*, vol. 23, no. 2, pp. 79–80, Dec. 2018, [Online]. Available: https://doi.org/10.1016/j.tics.2018.11.004
3. P. Teilhard De Chardin, *The phenomenon of man*. New York, United States of America: Harperperennial Modernthought, 1955.
4. P. Teilhard De Chardin, *The future of man*. New York, United States of America: Harper & Row Publishers, 1959.
5. J. Stray, R. Iyer, and H. Puig Larrauri, "The algorithmic management of polarization and violence on social media," *Knight First Amendment Institute*, Aug. 22, 2023. https://knightcolumbia.org/content/the-algorithmic-management-of-polarization-and-violence-on-social-media (accessed Aug. 04, 2025).
6. S. Dang, "Whistleblower says Facebook put profit before reining in hate speech," *Reuters*, Oct. 04, 2021. https://www.reuters.com/technology/facebook-whistleblower-reveals-identity-ahead-senate-hearing-2021-10-03/ (accessed Aug. 16, 2025).
7. P. Teilhard De Chardin, *Letters from a Traveler*. New York, United States of America: Harper & Row, 1969.
8. J. Wise, "Boldt: the great pretender: The withdrawal of almost 90 fraudulent studies by a German anaesthetist is one of the biggest medical research scandals of recent time," *BMJ*, vol. 346, pp. 16–18, Mar. 2013, [Online]. Available: https://www.bmj.com/bmj/section-pdf/187846?path=/bmj/346/7900/Feature.full.pdf
9. U.S. Department of Justice, "GlaxoSmithKline to Plead Guilty and Pay $3 Billion to Resolve Fraud Allegations: Largest Health Care Fraud Settlement in U.S. History," *Justice.gov*, Jul. 02, 2012. https://www.justice.gov/archives/opa/pr/glaxosmithkline-plead-guilty-and-pay-3-billion-resolve-fraud-allegations-and-failure-report (accessed Aug. 19, 2025).
10. I. A. Cristea, E. M. Cahan, and J. P. A. Ioannidis, "Stealth research: Lack of peer reviewed evidence from healthcare unicorns," *European Journal of Clinical Investigation*, vol. 49, no. 4, p. e13072, Jan. 2019, doi: 10.1111/eci.13072.
11. U.S. Department of Justice, "Abbott Laboratories Sentenced for Misbranding Drug: Judge Imposes $500 Million Fine and $198.5 Million Forfeiture for Illegal Marketing," *Justice.gov*, Oct. 02, 2012. https://www.justice.gov/archives/opa/pr/abbott-laboratories-sentenced-misbranding-drug (accessed Aug. 24, 2025).
12. L. James, "Attorney General James Secures Over $200 Million from Gilead Sciences for Paying Illegal Kickbacks," *New York State Attorney General*, Jul. 15, 2025. https://ag.ny.gov/press-release/2025/attorney-general-james-secures-over-200-million-gilead-sciences-paying-illegal (accessed Sep. 08, 2025).
13. T. S. S. Rao and C. Andrade, "The MMR vaccine and autism: Sensation, refutation, retraction, and fraud," *Indian Journal of Psychiatry*, vol. 53, no. 2, pp. 95–96, Jun. 2011, doi: 10.4103/0019-5545.82529.
14. Amnesty International, "Forensic Methodology Report: How to catch NSO Group's Pegasus," *Amnesty International*, Jul. 18, 2021. https://www.amnesty.org/en/latest/research/2021/07/forensic-methodology-report-how-to-catch-nso-groups-pegasus/ (accessed Aug. 31, 2025).
15. F. Huang, "Could China's cautious new research strategy stifle its science-leadership ambitions?," *Nature*, Nov. 2025, doi: 10.1038/d41586-025-03492-9.