The Oath of Researchers and Developers

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Editorial

Misinformation, biased research, and unethical tech use are on the rise, threatening trust in science. The Oath of Researchers and Developers sets clear, practical guidelines to counteract fake news, misleading studies, and irresponsible innovation. Unlike vague ethical codes, it provides concrete examples of ethical dilemmas and real-world consequences. Inspired by the Hippocratic Oath, it promotes transparency, accountability, and integrity, ensuring science works for society, not against it.

1 Introduction and motivation

In an age where facts and fiction blur more than ever—where multimedia platforms broadcast unverified information to a global audience in an instant—questions about trust, authority, and accountability have never been more urgent. Encyclopaedias and scientific journals were once considered unassailable sources of knowledge, yet they, along with news outlets, now grapple with significant ideological and commercial pressures. Likewise, ethical standards, once considered cornerstones of academic and professional integrity, risk erosion in an environment that often prioritizes speed and sensationalism over thoughtful analysis. The rapid advent of artificial intelligence (AI) further complicates this landscape, providing transformative opportunities even as it raises critical questions about bias, responsibility, and transparency.

Beyond ideologies, politics, and fake news, unscientific trends continue to gain momentum through the pervasive influence of social networks. A moderately well-known influencer can attract thousands—or even tens of thousands—of views, which is often one or two orders of magnitude more than the readership of a typical scientific paper. Meanwhile, social-media content is typically of lower quality than everyday discourse, whereas scientific publications must meet rigorous standards to uphold objective truth. As a result, we are witnessing not only the spread of "fake news", but also the rise of fake social networks, deceptive websites, and even partially fraudulent encyclopedias—trends that indicate the emergence of "fake science."

Reversing this trajectory is crucial. To maintain public trust in science, we must protect information integrity and promote evidence-based content. Reaffirming the core values underlying research and development has thus become an essential moral and intellectual imperative.

In this editorial, we address these challenges by returning to one of the earliest pledges of professional ethics: the Hippocratic Oath. Although originally designed for medical practitioners, its guiding principles—"do no harm," uphold beneficence, and maintain integrity—are remarkably relevant across all fields of inquiry. By adapting and modernizing the Hippocratic Oath with the support of contemporary resources and large language models (LLMs), we seek to blend time-honored wisdom with modern-day realities, providing a means to reinforce ethical conduct and restore confidence in scientific endeavors.

We then introduce the Oath of Researchers and Developers, conceived not merely as a modern derivative of existing ethical codes, but rather as an active affirmation of enduring principles reinterpreted for a new generation. Through real-world examples—from addressing data privacy issues to counteracting misinformation—we illustrate tangible steps researchers and developers should take to uphold these commitments. Our vision is to guide early-career professionals toward a practice that respects both the innovative momentum of the digital age and the steadfast virtues of responsible scholarship.

Finally, we compare our adapted Hippocratic Oath and the newly proposed Oath of Researchers and Developers to other notable declarations in the broader field of research ethics. This comparative perspective underscores where our proposals converge with widely accepted norms and where they chart new ground, highlighting how each framework contributes to shaping a more ethically grounded future for research and development.

2 Modern Hippocratic Oath (revised)

1. Prioritize Patient Well-being:
   I will make the health and well-being of my patients my primary concern.

2. Maintain Competence and Continuous Learning:
   I will commit to lifelong learning and maintain the highest standards of medical practice through continuous professional development.

3. Respect Patient Autonomy, Dignity, and Privacy:
I will respect the autonomy of my patients, ensuring informed consent and protecting their dignity and privacy.

4. Practice Prudent and Safe Medicine:
I will practice medicine judiciously, avoiding unnecessary interventions and seeking consultation when appropriate to minimize harm.

5. Protect Patient Confidentiality:
I will safeguard the confidentiality of patient information.

6. Ensure Equitable and Accessible Care:
I will strive to provide fair and accessible care to all patients, regardless of their background or circumstances.

7. Uphold Professional Ethics and Integrity:
I will adhere to the highest ethical standards of the medical profession, maintaining honesty and integrity in all my actions.

3 The Oath of researchers and developers

Drawing upon the foundational principles of the medical profession's oath, the Oath of Researchers and Developers underscores the ethical conduct and societal responsibility that underpin advancements in knowledge and technology. The explanations and examples that follow offer practical, concrete scenarios designed to affirm these guiding values.

1. Advance knowledge for human benefit

I will strive to create and disseminate knowledge that benefits humanity, whether by deepening our understanding (declarative knowledge) or through its practical application (operational knowledge, systems, or devices).

Explanation: This principle highlights the importance of contributing positively to society through research and development. Declarative knowledge broadens our theoretical understanding (e.g., discovering a new physical law), while operational knowledge yields tangible solutions (e.g., designing an innovative bridge). Both fundamental research and its practical translation are encouraged, provided they serve the greater good. Crucially, knowledge need not be universally popular or accepted, as long as it holds genuine benefit for humanity.

Examples: Initiatives like social networks or commercial AI programs can be ethically dubious if they risk harming users. In such cases, conscientious researchers should refuse involvement. Conversely, a commercial venture can be justified if it contributes meaningfully—for instance, by developing a new product that tangibly improves day-to-day life.

2. Consider overall and societal impact and mitigation of harm

I will thoroughly evaluate the potential societal impact of my work, striving to maximize positive outcomes and minimize potential harm—even when developing technologies with dual-use potential.

Explanation: This pledge underscores the ethical responsibility to anticipate and mitigate broader consequences (environmental, social, economic, etc.). "Dual-use potential" refers to technologies with both beneficial and harmful applications (e.g., nuclear energy for defence). Here, "harm" refers to harm inflicted on society, rather than personal risk to the researcher or threats to those who may benefit from myths or misconceptions.

Examples: When creating a new AI system, one should have in mind that there is a slight chance of the program going astray, and therefore taking precautions to prevent any such case is a must.

Another example are military applications which are acceptable for researchers as long as it is not clear that the harm outweighs the benefits. An example of a forbidden weapon development would be a fully autonomous weapon that is going to be applied on humans or giving AI a decisive role in using nuclear bombs.

3. Adhere to established scientific principles and knowledge

I will respect both empirically verified science and generally acknowledged truths, refraining from dismissing well-founded facts. In cases of error, I will conduct thorough investigations, acknowledge mistakes, and publish necessary corrections or retractions.

Explanation: Social and cultural arenas—such as films—often explore imaginative or science-fiction concepts, spanning both physical and mental realms. In contrast, our actual physical and technological environment is rigorously studied and validated, requiring scientists to adhere to established facts. Researchers who engage in the deliberate and repeated falsification or fabrication of data or research results must be held accountable for scientific misconduct, which may include removal from the scientific community upon verified proof. However, sound evidence and thorough evaluation—rather than public consensus—determine scientific validity. Galileo Galilei's heliocentric theory, once condemned as heresy, ultimately prevailed because it was grounded in verifiable observations rather than popular opinion.

Examples: There are extreme views, such as the denial of anthropogenic climate change, vaccine conspiracies, or the flat-Earth theory. These beliefs, however, are

categorically refuted by overwhelming scientific evidence. For instance, the spherical shape of the Earth is undeniably proven by satellite imagery and countless historical voyages of circumnavigation.

Many countries allow individuals to legally change their gender, illustrating the distinction between social/legal constructs and biological realities. While almost all humans possess XX or XY chromosomes, a fundamental scientific fact, asserting that a biological male is not a man is scientifically inaccurate and should be avoided in scientific discourse. However, in non-scientific settings, individuals may be identified in diverse ways.

4. Pursue, communicate, and share truth transparently and accountably

I will rigorously pursue truth, communicate my findings honestly and transparently, and actively share knowledge within both the scientific community and the broader public. I will remain accountable for my methods, ensuring they are open to scrutiny, while protecting confidentiality only when it serves the greater good.

Explanation: Honest pursuit of truth involves conducting rigorous research, reporting all results—including contradictory ones—accurately, and clarifying the probabilistic or provisional nature of scientific findings. Truth, in this context, stands independent of the source, messenger, or ideology and should be defended even when it is unwelcome or risks personal consequences. Researchers who commit fabrication, falsification, or plagiarism undermine the integrity of science, while those who fail to support known scientific facts in public—or remain silent—also neglect their professional responsibilities.

Transparency not only promotes reproducibility and peer review—pillars of scientific progress—but also bolsters public trust. When researchers share their data, methods, and reasoning openly, they enable others to verify claims and build upon discoveries. However, there may be rare instances (e.g., matters of national security, intellectual property) where certain details must be withheld for the greater good; such decisions demand clear justification.

Finally, it is crucial to distinguish between personal opinion and research-based opinion. Everyone enjoys freedom of personal expression, as typically guaranteed by law, but if a researcher's claim falls within their field of expertise, it must withstand professional scrutiny. Persistently promoting false scientific claims while posing as an expert undermines credibility and may have consequences.

Examples: Researchers have an obligation to disseminate established facts—for instance, that Earth is round—even at some personal cost. Only under truly severe circumstances should they postpone sharing such knowledge.

In certain extreme cases, scientists asserting there are two biological sexes have been fired. While losing one's position may be considered a "harsh consequence" that warrants pragmatic caution, it remains crucial to defend factual truths and remove from the research community those who persistently deny them.

Assume a researcher in the field of economics finds that selling a national bank is not beneficial for the country. Should he actively promote this analysis or not? The Oath clearly demands promotion of relevant revelations for the local and global community. Not doing so is close to neglecting the Oath.

Finally, a professor endorsing a policy outside their field of expertise is free to hold and express a personal stance, provided it does not misrepresent scientific consensus. However, if they claim such views are rigorously tested within their discipline—despite contradictory evidence— professional accountability mechanisms should apply.

5. Uphold ethical standards and professional responsibility

I will adhere to the highest ethical standards and act with professional responsibility in all my research and design endeavors.

Explanation: This is a general commitment to ethical and responsible conduct, encompassing adherence to professional codes, regulations, and best practices. Adherence to ethical standards and professional integrity safeguards the welfare of individuals and communities impacted by research outcomes, reinforcing the commitment to ethical conduct. Not all can be defined in the Oath for directing proper research activities. Such an examples are ethical and professional standards that should be followed as much as possible.

Examples: Researchers often cooperate in research groups with professional and social interactions. The joint research principles and goals should prevail over the local ones, e.g., not helping a colleague in trouble with a motive to achieve a better position due to that activity. Collegial Support: In a research group, members should collaborate openly and assist one another, rather than withholding help to gain a competitive edge.

Conflict of interest: Researchers must disclose funding sources, affiliations, or any other potential conflicts to ensure transparency and maintain trust in their findings. Addressing Misconduct: If a colleague's work shows serious flaws or unethical practices, it is every researcher's responsibility to address the issue—protecting the integrity of the field, even if doing so may be personally or professionally challenging.

Fair peer review: Evaluating colleagues' work should involve impartial judgment, free from personal biases or favoritism, to maintain a fair and constructive scientific environment.

In particular, no form of discrimination—whether sexism, ageism, racism, or any other form of prejudice—should be tolerated or perpetuated.

6. The self-healing role of the scientific community

I will support and actively promote only researchers following the Oath and insist on detaching the ones not following the Oath from scientific ranks and in extreme cases from all positions. I shall support fellow scientists when they face unjust attacks, provided they adhere to this Oath.

Explanation: Just as any organism requires self-defence mechanisms to survive, the scientific community must protect itself against unjust assaults. This can be likened to the human immune system. What, then, are the safeguards of true science? **We** researchers and developers and our societies are responsible for defence of true science and scientists. We should defend members of our society from the unfounded ideological attacks, and we should refrain from supporting individuals for scientific or developmental positions if they do not adhere to the principles of this Oath.

Examples: Throughout history and in recent years, numerous scientists have faced attacks for disseminating the truth and debunking myths. Unfortunately, these scientists often lacked support from the scientific community and organizations such as associations and academies. In some cases, ideological attacks on scientists were even endorsed by their peers. It is critical for the scientific community to recognize that allowing ideological viewpoints to prevail severely undermines true science. Empirical evidence allows us to perceive the natural gender of a human, regardless of formal or declarative identification. If science adopts ideological stances, it ceases to be science. The Earth becomes flat.

Another example is that of an editor at the highly influential journal Scientific American, who resigned in protest after the U.S. presidential election produced a result contrary to their preference, and then used social media to ridicule 'uneducated voters.' Can such a person truly advocate for objective science and development, free from political and ideological bias?

7. Foster education, mentorship, and public engagement

I will actively contribute to the education and mentorship of aspiring researchers, promote interdisciplinary collaboration, and engage with the broader public to enhance scientific understanding and literacy.

Explanation: This commitment recognizes that research thrives when knowledge is openly shared across generational, disciplinary, and societal boundaries. Mentorship and education ensure the continuation of robust scientific inquiry, while public engagement bridges the gap between specialized expertise and community needs. By investing in teaching, outreach, and collaborative efforts, researchers help cultivate a more informed society and a stronger foundation for future innovations.

Examples: Mentorship: Guiding students or early-career professionals through project supervision, workshops, or individual consultations.

Public Outreach: Delivering public lectures, creating educational content, or participating in community events to spark curiosity and spread scientific awareness.

Interdisciplinary Collaboration: Organizing seminars or research initiatives that connect experts from varied fields to tackle complex global challenges—such as climate change, healthcare, or AI governance.

The Oath of Researchers and Developers can be summarized as:

1. **Serve Humanity:** Ensure your work ultimately benefits people and our civilization, whether advancing theoretical understanding or yielding practical solutions.

2. **Be Aware of Societal Impact:** Thoroughly assess potential risks and benefits, striving to maximize positive outcomes and minimize harm—even for dual-use technologies.

3. **Honor and Protect Established Facts:** Adhere to verified scientific principles, investigate errors honestly, and rectify or retract findings if proven invalid.

4. **Pursue and promote truth proactively:** Actively engage in seeking accurate results, communicate them transparently, and remain accountable for your methods—always distinguishing personal viewpoints from rigorously validated scientific and engineering conclusions. It is your duty to promote, uphold, and defend the truth, even in the face of negative backlash.

5. **Maintain ethical and professional standards:** Respect recognized ethical standards and practice responsible conduct in all research and development activities.

6. **Protect the scientific and developers' community and individuals:** Preserve the integrity and security of our field by actively supporting colleagues who uphold these standards against ideological or public attacks, and ensure that those who fail to follow the Oath are not placed in influential positions.

7. **Educate and engage:** Mentor future researchers, foster interdisciplinary cooperation, and engage the public to enhance scientific understanding and literacy.

4   Similarities between the oaths

4.1   With the Hippocratic Oath

While the Hippocratic Oath centers on the welfare of patients and the Oath of Researchers and Developers focuses on advancing knowledge and technology for the benefit of humanity, both share core ethical themes:

- **Beneficence (Acting for the Good)**

  Physicians commit to promoting patient well-being; similarly, researchers and developers pledge to harness knowledge and technology for the greater social good.

- **Non-Maleficence (Avoiding Harm)**

  Doctors endeavor to minimize harm by avoiding unnecessary interventions. Researchers and developers, in turn, strive to foresee and mitigate any societal, environmental, or economic harm their work might cause.

- **Truthfulness and transparency**

  Both Oaths value honesty and open communication. Physicians must accurately diagnose and share relevant information with patients, while researchers and developers must disclose findings and methodologies clearly, enabling peer review and public trust.

- **Confidentiality and protection of information**

  Medical professionals safeguard patient confidentiality. Researchers and developers likewise maintain discretion, protecting sensitive information unless the public interest unequivocally demands disclosure.

- **Upholding ethical standards**

  Each Oath underscores the highest ethical principles, whether in the practice of medicine or in research and development. By maintaining professional integrity and respecting established norms, both communities protect the welfare of those they serve.

4.2   Relations with other ethical codes and principles

While the Oath of Researchers and Developers draws heavily from the Hippocratic Oath, it also aligns with established ethical frameworks across various domains:

- **Researcher conduct**

Ethical Guidelines for Research (e.g., National Institutes of Health (NIH) Guidelines for Research, European Code of Conduct for Research Integrity): Institutions and funding agencies often issue guidelines emphasizing integrity, honesty, objectivity, and responsible research conduct—covering areas like data integrity, plagiarism, authorship, and conflicts of interest. These align with the Oath's commitment to truthfulness, transparency, and high ethical standards.

Codes of Conduct for Scientific Societies (e.g., American Chemical Society Code of Conduct, World Medical Association Declaration of Helsinki): Many professional organizations stipulate standards for research, publication, and collegial interactions. These typically promote scientific integrity, open communication, and the avoidance of misconduct, echoing the Oath's emphasis on honesty, transparency, and accountability.

- **Engineering ethics**

Codes of Ethics for Engineers (e.g., NSPE Code of Ethics, IEEE Code of Ethics): Promulgated by bodies such as the National Society of Professional Engineers (NSPE), these codes stress public safety, environmental protection, and professional responsibility—mirroring the Oath's principles of assessing societal impact, minimizing harm, and upholding ethical standards.

ACM Code of Ethics and Professional Conduct (Association for Computing Machinery): This comprehensive code provides guidance for computing professionals, emphasizing ethical considerations such as honesty, fairness, respect for users' rights, and the importance of public interest. It aligns with the Oath's principles by advocating for responsible use of technology, minimizing harm, and ensuring that computing serves humanity.

- **AI ethics guidelines**

Principles for AI (e.g., OECD AI Principles, UNESCO Recommendation on the Ethics of Artificial Intelligence): Various international organizations and initiatives have proposed guidelines stressing fairness, accountability, transparency, and human oversight in artificial intelligence. These requirements closely parallel the Oath's calls to avoid bias, safeguard societal welfare, and maintain open, responsible research practices.

- **Universal declaration of human rights**

(United Nations, 1948): Although not specifically crafted for researchers, this declaration champions essential human freedoms and the right to benefit from scientific progress. It underpins the Oath's overarching vision of advancing knowledge for humanity's collective well-being while carefully considering potential societal impact.

4.3 Similarities between the Oath and the EU AI Act

- **Focus on human well-being**

Oath: Prioritizes the advancement of knowledge for human benefit and the minimization of potential harm.

EU AI Act (Regulation (EU) 2024/1689): Seeks to ensure AI systems uphold human rights, safety, and key societal values, banning applications that pose a clear threat to well-being and fundamental rights.

- **Transparency and accountability**

Oath: Demands openness in research methods, findings, and accountability for actions.

EU AI Act: Requires high-risk AI systems to incorporate human oversight and mandates transparency, ensuring that users can understand and challenge AI-driven decisions.

- **Ethical considerations**

Oath: Stipulates adherence to rigorous ethical standards and professional responsibility.

EU AI Act: Establishes a trustworthy AI framework, emphasizing fairness, non-discrimination, and respect for personal data throughout the AI lifecycle.

- **Risk assessment and mitigation**

Oath: Encourages researchers to proactively assess potential risks and strive to minimize harm.

EU AI Act: Categorizes AI systems by risk level and imposes requirements for conformity assessments, ongoing monitoring, and risk management for high-risk applications.

- **Avoiding harm**

Oath: Explicitly discourages actions likely to harm society.

EU AI Act: Prohibits AI systems deemed dangerous to public safety, livelihoods, and rights, also barring practices that manipulate or exploit human vulnerabilities.

By comparing these core principles, it appears that both the Oath of Researchers and Developers and the EU AI Act converge on the goal of promoting responsible, ethical innovation. The Oath provides a framework for individual researchers, while the EU AI Act offers legal and regulatory guidelines for AI deployment across the European Union.

5 Conclusions

Acknowledging these connections, the Oath of Researchers and Developers draws upon a broad legacy of ethical principles and contributes to a diverse, evolving body of guidelines that govern research and development in numerous fields. By redefining the values and motivations of researchers and designers, this text aims to serve both present and future generations.

It is essential to acknowledge that our civilization faces escalating pressures. Even the most fundamental scientific truths face scrutiny, and scientists who resist non-scientific ideologies risk attacks or even the loss of their positions. It is on us to reintroduce basic scientific and ethical standards of an advanced civilisation.

Always remember that science and development rank among humanity's greatest assets, propelling technological progress and enhancing quality of life. Science and development are the most noble of professions with highest standards and also responsibilities, dedicated to preserving truth and objectivity in the pursuit of the common good.

Acknowledgement

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