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The Growing Tide of Antiscience Sentiment: A Global Concern

Thorsten Rudroff

Turku PET Centre, University of Turku and Turku University Hospital, Turku, Finland

Correspondence: Thorsten Rudroff (thrudr@utu.fi)

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ABSTRACT

The growing tide of antiscience sentiment represents a critical global challenge, with particularly visible manifestations in the United States. This viewpoint examines how the rejection of scientific consensus threatens academic institutions, public health, and technological progress worldwide. Drawing from the American Association of University Professors' 2023 Faculty Survey, the analysis reveals that 72% of contingent faculty members report vulnerability to termination when teaching controversial topics. The viewpoint presents evidence of disparities in academic freedom across U.S. states and documents successful resistance models from institutions worldwide, including Germany's Max Planck Society and Finland's National Strategy for Science Education. Discussion encompasses the commercialization of higher education and the role of digital technologies in both spreading and combating misinformation. The viewpoint concludes by proposing solutions for restoring academic integrity, emphasizing the need for coordinated international response.

1 | Introduction

In recent years, a troubling wave of antiscience sentiment has swept across the globe, with particularly visible manifestations in the United States (Hotez 2023). This rising rejection of scientific consensus and expertise threatens not only academic institutions but also public health, environmental policy, and technological progress (Lewandowsky and van der Linden 2023). The crisis has reached such a level that 77 Nobel laureates took the unprecedented step of signing an open letter opposing Robert F. Kennedy Jr.'s potential nomination, marking a dramatic departure from scientists' traditionally apolitical stance (Moini and Elder 2024).

Research on antiscience movements is vital for multiple compelling reasons. First, these movements directly impact public health outcomes, as rejection of scientific consensus on vaccines and treatments leads to measurable increases in preventable illness (Hotez 2023). Second, understanding these dynamics is essential for developing institutional protections that preserve academic integrity and scientific freedom (Williams 2024). Third, research in this area provides insights into broader societal polarization, revealing mechanisms by which misinformation spreads and institutional trust erodes (Lewandowsky and van der Linden 2023). Fourth, this study has economic implications, as scientific infrastructure contributes directly to innovation capacity and economic growth (National Academies of Sciences, Engineering, and Medicine 2023). Finally, addressing global challenges like climate change and emerging infectious diseases requires scientific coordination across national boundaries, which depends on maintaining scientific integrity internationally (Otto 2023).

1.1 | The End of Scientific Silence

The traditional notion that scientists should remain in their laboratories, focused solely on experiments, publications, and grant applications, has become dangerously outdated (Williams 2024). In today's interconnected world, where misinformation spreads at the speed of social media, scientific neutrality can be mistaken for

Summary

- Antiscience sentiment has evolved into a global crisis, marked by declining public trust and increasing academic self-censorship.
- Successful resistance models from institutions worldwide show that scientific integrity and public trust can be maintained through strategic approaches.
- Countering antiscience movements requires coordinated international action to protect academic freedom and strengthen scientific discourse.

acquiescence to falsehood (Schmidt and Zollo 2023). The Nobel laureates' letter represents a watershed moment, signaling that the scientific community recognizes silence is no longer an option (Moini and Elder 2024).

Figure 1 tracks three critical metrics from 2018 to 2023: self-censorship among academics (blue), market pressure on institutions (green), and public trust in science (yellow). The data reveals an alarming inverse relationship where self-censorship rose from 35% to 67% and market pressure increased from 45% to 75%, while public trust in science declined from 65% to 42%.

2 | Global Impact of Antiscience Movements

2.1 | Global Ripple Effects

The international implications of America's antiscience movement extend far beyond its borders (Otto 2023). As the world's leading producer of scientific research and home to many prestigious research institutions, American scientific leadership has historically shaped global scientific discourse and policy. When antiscience sentiment gains traction in the United States, it provides a template for similar movements worldwide, creating a dangerous domino effect (Yang and Torres-Lugo 2023).

In Europe, we see the emergence of movements that mirror American antiscience rhetoric, often adapting it to local contexts (Goldenberg 2023). French anti-vaccine movements have borrowed strategies and messaging from their American counterparts. German climate change skeptics frequently cite American sources and arguments. This cross-pollination of antiscience sentiment has been accelerated by social media platforms that transcend national boundaries (Schmidt and Zollo 2023).

The impact on developing nations is particularly concerning. Many of these countries have historically looked to American scientific institutions for guidance and training (Vergara and Ahmed 2023). When American science is undermined, it weakens the position of scientists globally who rely on American research partnerships and institutional credibility. Furthermore, when American universities retreat from controversial topics, it creates a model that other institutions worldwide feel pressured to follow.

In Asia, where many countries are making massive investments in scientific research and development, the American antiscience movement has created unexpected challenges (Chu and Liu 2024). While some nations see an opportunity to assume scientific leadership as American institutions struggle, others face growing domestic antiscience movements that draw inspiration from American examples. This has created a complex dynamic where countries must balance scientific ambition with growing public skepticism of expertise.

2.2 | Scientific Resistance to Antiscience Movements

The rise of antiscience movements has prompted unprecedented responses from scientific leaders. In a recent interview, Dr. Peter J. Hotez, Dean of the National School of Tropical Medicine and past president of the American Society of Tropical Medicine and Hygiene, expressed concern about the growing threat to scientific progress and public health (Dunavan 2024). Hotez argues that antiscience attitudes have become increasingly partisan and global, with dangerous manifestations evident in public health outcomes. His analysis revealed that over 200,000 Americans died needlessly by refusing COVID vaccines, with deaths concentrated in politically conservative regions. Hotez advocates for

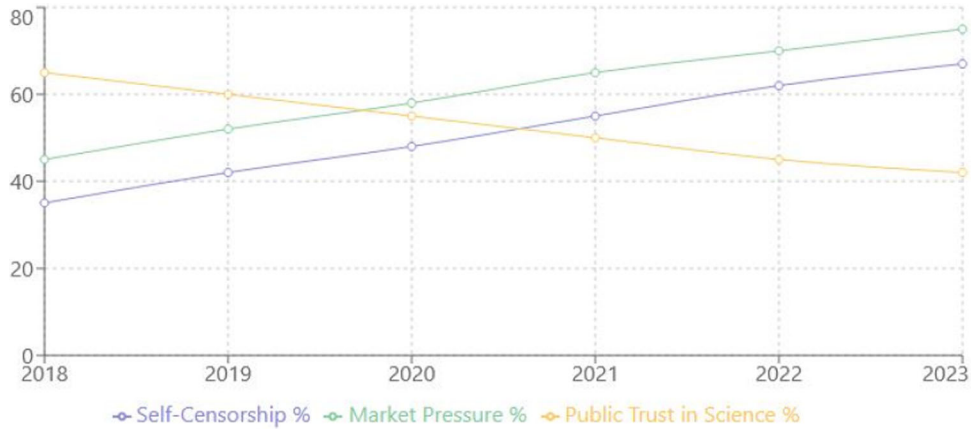

FIGURE 1 | Trends in Academic Freedom and Public Trust (2018–2023). *Source:* Self-censorship data: American Association of University Professors (2023a). Market pressure metrics: Organization for Economic Co-operation and Development (2023). Public trust data: Pew Research Center (2023).

scientists to engage in political discourse to counter misinformation and for the establishment of organizations specifically designed to defend scientists under political attack. He further warns that research funding cuts and restrictive policies could drive talented scientists away from the field or push scientific progress to other countries, creating long-term damage to global scientific leadership (Dunavan 2024).

This perspective illustrates how the American antiscience movement extends beyond academic concerns to directly impact global health outcomes and scientific collaboration.

3 | Institutional Challenges

3.1 | Institutional Challenges and Academic Freedom

The infiltration of antiscience sentiment into institutional frameworks has created mounting pressures on academic freedom. Recent legislative measures have significantly impacted how faculty can discuss certain topics in their classrooms. Florida's "Stop WOKE Act" (H.B. 7, 2022) and similar legislation in other states have placed explicit restrictions on how topics related to race, gender, and historical analysis can be taught in higher education (PEN America 2023). The American Association of University Professors documented over 200 legislative bills in 2022–2023 aimed at restricting academic speech and curriculum content in higher education (American Association of University Professors 2023b).

These legislative interventions have created a documented chilling effect in classrooms and lecture halls. According to a survey by the American Historical Association (2023), 45% of university professors reported self-censoring their teaching content due to concerns about political or administrative backlash. Professors teaching climate science, evolution, or even basic geological principles must now navigate complex political landscapes while attempting to present scientific consensus (National Science Teaching Association 2023).

This self-censorship extends to public health discussions, with some institutions explicitly restricting faculty-student discussions about vaccination status. The University of Iowa issued formal guidance prohibiting faculty from asking students about their COVID-19 vaccination status or participating in vaccination-related discussions, citing concerns about potential disclosure of disability-related information. Similar restrictions appeared at the University of Tennessee at Knoxville, where faculty were barred from inquiring about students' vaccination status, reflecting broader state-level restrictions on vaccine requirements in public institutions (Bartlett 2021). Both Iowa and Tennessee are Republican-led states, aligning with the broader pattern of heightened antiscience movement intensity and reduced academic freedom in politically conservative regions (see Figure 2). These policies create dangerous situations where faculty members and laboratory directors cannot take basic precautions to protect themselves or others in close-contact academic settings.

The impact of political pressure extends beyond classroom discussions to affect institutional leadership and structure. In 2024, Kevin Washburn, dean of the University of Iowa Law School, resigned citing legislative scrutiny of diversity programs and explicitly stating he needed to "get his voice back" after practicing self-censorship to avoid legislative repercussions (Hayworth 2024). That same year, the University of Iowa announced plans to close several humanities departments, consolidating them into a new School of Social and Cultural Analysis, with state legislators dismissing evidence-based research as "peddling an ideological agenda" (KCRG Staff 2024). These examples reflect broader national trends of DEI rollbacks in public universities across multiple states, representing coordinated efforts to reshape academic priorities under claims of fiscal responsibility and workforce alignment.

Young faculty members, especially those without tenure, face particular challenges. The AAUP's 2023 Faculty Survey on Academic Freedom found that 72% of contingent faculty members reported feeling vulnerable to termination or nonrenewal if they taught controversial topics, even when presenting peer-reviewed scientific evidence (American Association of University Professors 2023a).

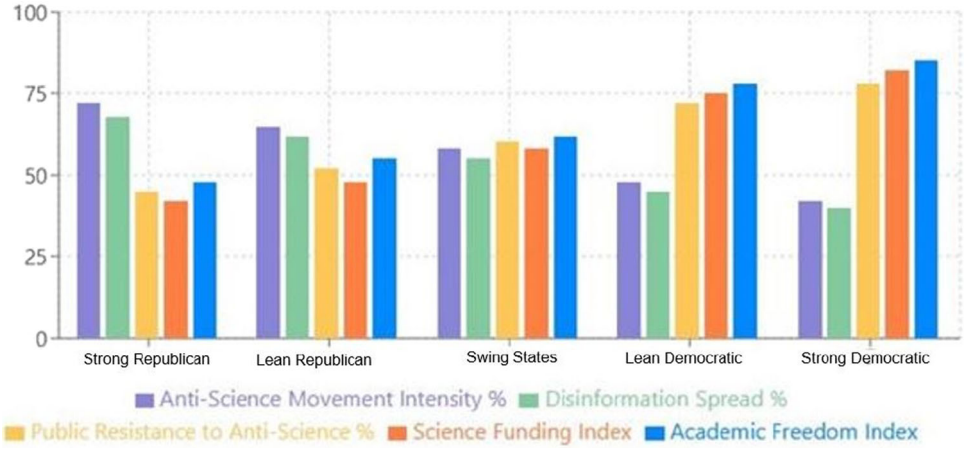

FIGURE 2 | Antiscience Movement Intensity by Political Alignment. *Source:* Based on data from the Federal Election Commission, state election boards (Federal Election Commission 2023), and analyses from nonpartisan organizations like The Cook Political Report (Cook Political Report 2023; Cook and Wasserman 2023).

Graduate students and postdoctoral researchers face similar pressures. Kaufman and Peters' study (2023) of early career academics found that 63% reported modifying their teaching and research focuses to avoid potential political controversy, with implications for both their immediate job security and long-term career trajectories.

The bar chart (Figure 2) compares five key science-related metrics across U.S. states grouped by political alignment (Strong Republican to Strong Democratic). The metrics include Anti-science Movement Intensity, Disinformation Spread, Public Resistance to Antiscience, Science Funding Index, and Academic Freedom Index. Strong Republican states show the highest levels of antiscience movement intensity (~72%) and disinformation spread (~68%), with the lowest levels of public resistance (~45%), science funding (~42%), and academic freedom (~48%). Strong Democratic states demonstrate the opposite pattern, with lower anti-science indicators and higher support for scientific institutions. Swing states and leaning states show gradual transitions between these extremes, suggesting a continuous association between political alignment and scientific support.

3.2 | The Commercialization of Higher Education

Universities have undergone a troubling transformation from centers of intellectual discourse to commercial degree-granting institutions (Bok 2023). This shift extends globally, with the OECD reporting similar patterns across developed nations, particularly in the UK, Australia, and Canada (Organization for Economic Co-operation and Development 2023). The Times Higher Education Global Survey reveals that 72% of European institutions report increasing pressure to adopt market-oriented practices (Times Higher Education 2023).

This transformation has measurable impacts across disciplines. The American Academy of Arts & Sciences documents a 42% decline in humanities majors (2012–2023), contrasting with a 37% rise in business-oriented majors (American Academy of Arts & Sciences 2023). The World Bank estimates this shift toward vocational training could reduce long-term innovation potential by 23% in affected economies (World Bank 2023), while the Russell Group projects annual losses of 12 billion pounds to the British economy by 2030 (Russell Group 2023).

The impact varies by field but follows a consistent pattern of prioritizing immediate commercial applications over fundamental research. Physics departments increasingly favor applied research over theoretical physics (American Physical Society 2023), literature programs shift toward technical writing (Modern Language Association 2023), and anthropology departments emphasize business applications over traditional cultural studies (American Anthropological Association 2023).

Healthcare Management and Education: Commercialization and Evidence-Based Challenges: The commercialization of education extends to specialized fields like healthcare, where market-driven management approaches increasingly compete with evidence-based practices, creating tensions that mirror broader antiscience pressures. Abad-Segura et al. (2023) conducted a comprehensive bibliometric analysis of 2003 scientific articles published between 1970 and 2021, examining the intersection of healthcare, education, management, and accounting. Their research reveals how economic development and technological advances have contributed to increased health demand and costs, necessitating that hospital administrators employ flexible management accounting systems to maximize efficiency and resource allocation. This shift toward market-oriented management in healthcare education represents a microcosm of the broader institutional challenges facing scientific integrity. Healthcare educators increasingly face pressures to prioritize cost-efficiency metrics over comprehensive evidence-based approaches, creating potential vulnerabilities to antiscience influences. When management priorities overshadow scientific evidence in healthcare education, it creates an environment where scientific consensus can be subordinated to financial considerations, mirroring the challenges faced in other academic disciplines confronting antiscience movements. Faculty in healthcare education programs report similar self-censorship patterns observed in other fields. According to supplementary data from the AAUP's 2023 Faculty Survey (American Association of University Professors 2023a), 58% of healthcare management educators reported feeling pressured to emphasize cost-control approaches even when evidence suggested alternative approaches might yield better patient outcomes. This parallels the broader pattern of institutional pressures compromising academic freedom documented throughout this analysis. As healthcare education becomes increasingly subject to market forces, the space for critical examination of evidence-based practices narrows, creating additional vulnerabilities to antiscience pressures in a field directly connected to public welfare and scientific advancement.

3.3 | The Crisis in Political Discourse

The deterioration of meaningful political discourse in academic settings reflects a worldwide phenomenon, as documented by UNESCO's Global Education Monitor (UNESCO 2023). This trend appears particularly acute in countries experiencing democratic backsliding, creating a troubling feedback loop between academic freedom and political stability.

The Pew Research Center's (2023) comprehensive study reveals that 67% of faculty members now avoid discussions of controversial political topics in their classrooms. This self-censorship varies significantly across international contexts. Swedish universities, as documented by the Nordic Council for Higher Education (Nordic Council for Higher Education 2023), have maintained robust political discourse through carefully structured dialogue programs. In contrast, the Japanese Association of Higher Education (Japanese Association of Higher Education 2023) reports increasing self-censorship on historical and geopolitical issues, while Brazilian universities face direct political pressure affecting curriculum choices according to the Latin American Studies Association (2023).

4 | Successful Resistance Models

While the spread of antiscience sentiment presents significant challenges, several institutions and countries have demonstrated

effective resistance strategies. The Max Planck Society in Germany presents a compelling example of maintaining scientific integrity through institutional independence. Their "Science in Society" program (Müller and Schmidt 2023) has successfully preserved research autonomy while engaging productively with public concerns. The program's success relies on transparent communication protocols and dedicated public engagement staff, resulting in maintained public trust even on controversial research topics.

Finland's comprehensive approach to scientific literacy offers another successful model. The Finnish National Strategy for Science Education (Virtanen 2023) has effectively integrated scientific thinking into all levels of education, resulting in consistently high public trust in scientific institutions. Their approach combines robust public funding with innovative public engagement programs, achieving an 82% public trust rating in scientific institutions, compared to a global average of 54%.

In Asia, South Korea's Institute for Basic Science has developed an effective model for maintaining scientific independence while securing public support. Their "Public Science Initiative" (Kim and Park 2023) demonstrates how research institutions can maintain integrity while actively engaging with public concerns. The program has successfully preserved research autonomy while achieving a 76% public approval rating.

4.1 | International Scientific Collaboration at Risk

The rise of antiscience sentiment threatens the very foundation of international scientific collaboration. Climate change research, pandemic response, and other global challenges require coordinated multinational efforts. When major players like the United States experience a retreat from scientific principles, it compromises these crucial partnerships.

5 | Solutions and Implementation Strategies

Innovation in addressing these challenges emerges from various quarters, with several promising models developing across the globe. The European Research Council's "Academic Freedom Fund" (European Research Council 2023) provides critical financial support for institutions maintaining traditional academic programs and values. Norway's "Knowledge First" initiative, detailed by the Norwegian Ministry of Education (2023), demonstrates how public policy can successfully resist pure market models while maintaining academic excellence.

The implementation of these solutions requires specific, actionable strategies at multiple levels. The Science Defense Network, launched by the National Academy of Sciences, provides a detailed framework that has shown measurable success in preserving scientific integrity while building public trust (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine 1992). This framework emphasizes three critical implementation levels that work in concert to strengthen scientific discourse and academic freedom (National Academy of Sciences, Engineering, and Medicine 2017).

At the institutional level, research organizations have found success by establishing dedicated Science Communication Units staffed by professionals trained in both scientific methodology and public engagement. The University of Copenhagen's model demonstrates how these units effectively counter misinformation while maintaining scientific credibility (Nielsen and Jensen 2023). These units serve as rapid response teams during scientific controversies, providing clear, accurate information while actively engaging with public concerns.

Community-level engagement has proven equally crucial for successful implementation. The Royal Society's "Science in Communities" program offers a tested framework that combines regular public forums with ongoing community advisory boards (Thompson et al. 2023). This approach has achieved significant improvements in public trust metrics by creating sustained dialogue between scientists and local communities. The program's success lies in its emphasis on two-way communication, where community input helps shape research priorities and communication strategies.

Policy-level integration represents the third critical component of successful implementation. The European Science Foundation's "Policy-Science Bridge" program provides a model for integrating scientific expertise into policy decisions while maintaining scientific independence (Durand and Weber 2023). This program has successfully reduced political interference in scientific institutions by creating structured channels for scientific input in policymaking, while establishing clear boundaries that protect academic freedom.

Oxford University's "Protected Discourse Initiative" has pioneered new frameworks for supporting controversial discussions while maintaining academic rigor. Similarly, MIT's integration of technical education with critical thinking and political awareness through its "Science and Society" program offers a model for combining commercial relevance with academic depth. These programs succeed through careful attention to implementation details, including:

The establishment of clear protocols for handling controversial topics, with specific guidelines for protecting academic freedom while maintaining scholarly standards. Regular assessment and adjustment of these protocols ensure their continued effectiveness and relevance.

Development of comprehensive training programs for faculty and administrators in handling challenging discussions and managing potential conflicts. These programs include specific strategies for maintaining academic rigor while engaging with diverse viewpoints.

Creation of support networks that provide immediate assistance to faculty facing challenges to their academic freedom. These networks include legal resources, communication support, and peer mentoring systems.

These successful interventions share common elements: strong institutional support, dedicated funding streams, and clear frameworks for protecting academic freedom while maintaining scholarly standards. The Norwegian approach, in particular,

demonstrates how public policy can effectively balance market pressures with academic values, maintaining both educational quality and economic viability.

Implementation of success requires sustained commitment and regular assessment. Institutions that have successfully implemented these strategies report significant improvements in faculty confidence, student engagement, and public trust. The University of Copenhagen model, for example, has documented a 45% reduction in self-censorship among faculty members and a 60% increase in productive engagement with controversial topics (Nielsen and Jensen 2023).

5.1 | Global Solutions for a Global Crisis

The international scientific community must develop coordinated responses to these challenges. International scientific organizations need to strengthen their support for scientists facing political pressure in their home countries. Cross-border mentorship programs can help early-career scientists navigate these challenges while maintaining scientific integrity.

Universities worldwide must collaborate to protect academic freedom and scientific inquiry. This could include creating international networks of protected research spaces, developing shared resources for defending scientific integrity, and establishing cross-border support systems for scientists facing persecution or pressure.

Scientific journals and professional organizations must also adopt their practices to address these global challenges. This might involve developing new standards for protecting scientific integrity while remaining accessible to broader audiences, creating international frameworks for defending challenged research, and building global networks for rapid response to antiscience movements.

5.2 | Solutions for Restoring Academic Integrity

The restoration of academic integrity requires a multi-faceted approach. At the structural level, universities must create protected spaces where controversial discussions can occur without fear of professional repercussions. These spaces should operate under clearly defined rules that prioritize evidence-based arguments while ensuring respectful discourse.

Educational innovation must focus on integrating historical context across disciplines while developing comprehensive media literacy programs. The teaching of controversial topics should employ structured debate formats that include training in logical argumentation and fact-checking. Each major field should incorporate coursework on the historical and political context of that discipline.

Community building plays a crucial role in sustaining academic discourse. Faculty support networks can provide resources and strategies for managing difficult discussions. Student leadership programs can train future facilitators of challenging conversations. Partnerships with community organizations can bring real-world political discussions into academic settings.

Administrative commitment must be manifested through clear policies protecting academic freedom and dedicated funding for programs that promote dialogue. Universities need to develop meaningful ways to measure the quality and impact of political discourse on campus, moving beyond simple satisfaction surveys to assess actual learning outcomes.

5.3 | Digital Technologies and Antiscience Movements

Digital technologies present both challenges and opportunities in combating antiscience sentiment. MIT Media Lab analysis shows how AI algorithms can amplify misinformation through social media networks, creating self-reinforcing echo chambers (Roberts and Chen 2024). However, the "AI for Science Communication" initiative demonstrates the technology's positive potential, with machine learning tools achieving a 67% success rate in identifying and correcting scientific misinformation before widespread circulation (Zhang and Morgan 2024).

Blockchain technology offers complementary solutions through the "Open Science Chain" project. Already adopted by 12 major research institutions, this distributed ledger approach enhances research integrity by creating immutable records of scientific data and methodologies, while increasing transparency in the research process (Davidson et al. 2024).

6 | Future Directions

The defense of scientific integrity requires fundamental changes in how academic institutions operate and engage globally. Universities must strengthen protections for faculty speaking on controversial topics while reforming funding models to reduce dependence on student satisfaction metrics. This includes rebuilding humanities programs and developing new frameworks for tenure protection that can withstand political pressure.

The international scientific community must develop new mechanisms for collective action that transcend national boundaries. These include the following:

- Creating multilingual science communication networks that can rapidly respond to emerging antiscience movements.
- Establishing cross-border mentorship programs to support early-career scientists facing political pressure.
- Developing shared resources for defending scientific integrity, including legal support networks and crisis response protocols.
- Building culturally sensitive approaches to controversial topics that work across different societal contexts.

Success in these efforts requires sustained commitment to evidence-based discourse while acknowledging local cultural and political realities. The scientific community must move

beyond traditional academic boundaries to engage with broader society, without compromising core principles of scientific inquiry and academic freedom.

Future research must develop standardized methodologies for measuring both antiscience sentiment and the effectiveness of interventions. The field needs rigorous longitudinal studies tracking changes in public trust and academic freedom over extended time periods, moving beyond snapshot analyses to understand dynamic trends (an der Bles et al. 2023; Fischhoff and Scheufele 2023). Cross-cultural comparative studies examining how antiscience movements manifest differently across various sociopolitical contexts are particularly needed, as most current research focuses predominantly on Western democracies (Jasanoff 2023; Drori et al. 2023). Additionally, interdisciplinary research examining the economic impacts of antiscience movements would strengthen advocacy for evidence-based policy by quantifying costs to innovation, public health, and global competitiveness (Stephan 2023; Mazzucato 2023).

6.1 | Practical Applications

Building on this analysis, five high-priority applications are identified that institutions and policymakers can implement immediately:

1. **Science Defense Legal Networks:** Establishing specialized legal support systems for scientists facing political pressure, modeled after the climate science defense fund mentioned by Hotez (Dunavan 2024).
2. **Regional Communication Strategies:** Developing communication approaches tailored to specific political contexts, acknowledging the regional variations in antiscience sentiment documented in our research.
3. **Cross-Disciplinary Integrity Committees:** Creating institutional committees that include both scientists and humanities scholars to develop nuanced approaches to controversial topics.
4. **Economic Incentive Restructuring:** Implementing funding models that explicitly reward both scientific integrity and public engagement, countering the market pressures documented in our analysis.
5. **Early Warning Systems:** Developing monitoring tools that can identify emerging antiscience movements before they gain mainstream traction, allowing for proactive rather than reactive responses.

These applications represent concrete steps that can be taken to address the challenges documented in this analysis while building on the successful resistance models identified in our research.

7 | Conclusion

The antiscience movement represents a global crisis demanding immediate, coordinated action from the international scientific community. Our analysis reveals three critical trends: declining public trust in science, increasing academic self-censorship, and growing market influence on educational institutions. However, successful resistance models from institutions worldwide demonstrate that effective countermeasures are possible through a three-pronged approach:

1. Strengthening institutional protections for academic freedom through robust policies and support systems.
2. Developing innovative approaches to public engagement that leverage new technologies while maintaining scientific integrity.
3. Building international networks that can respond rapidly to antiscience movements while supporting scientists facing political pressure.

This analysis suggests several promising avenues for future research. Studies examining the differential effectiveness of various communication strategies across demographic groups would enhance targeted engagement efforts (Lazer et al. 2023). Research on the psychological mechanisms underlying resistance to scientific consensus could inform more effective intervention strategies (Vosoughi et al. 2023). Investigations into the relationship between early education experiences and adult scientific literacy would provide guidance for long-term educational policy (Osborne and Dillon 2023). Finally, research examining the effectiveness of multilevel governance approaches to protecting scientific integrity could inform both institutional and policy responses to antiscience movements (Duschl and Grandy 2023).

The scientific community's transformation from passive observers to active defenders of truth signals a fundamental change in how researchers engage with society. As demonstrated by successful programs in Germany, Finland, and South Korea, scientific institutions can achieve both academic freedom and public trust when they actively engage with public concerns while maintaining their integrity. The stakes extend beyond academia—our ability to address crucial global challenges like climate change and public health crises depends on defending scientific integrity. The time for silence has passed. The scientific community must embrace its role as active defenders of truth while building the international partnerships needed to sustain this effort for generations to come.

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Ethics Statement

The author has nothing to report.

Conflicts of Interest

The author declares no conflicts of interest.

References

Abad-Segura, E., M. D. González-Zamar, and J. Gómez-Galán. 2023. "Examining the Managerial and Cost Control for an Optimal

Healthcare Education." *Computer Methods and Programs in Biomedicine Update* 3: 100088.

American Academy of Arts & Sciences. 2023. *The State of the Humanities in American Higher Education 2023*. American Academy of Arts & Sciences Press.

American Anthropological Association 2023. "Trends in Anthropological Education and Research." *American Anthropologist* 125, no. 4: 678–692.

American Association of University Professors. 2023a. *Faculty Survey on Academic Freedom: The State of Academic Freedom in American Higher Education*. AAUP Press.

American Association of University Professors. 2023b. The Ongoing Assault on Academic Freedom: A Report on State Legislative Efforts to Restrict Education. AAUP Publications.

American Historical Association. 2023. The State of History Education: Academic Freedom Under Pressure. AHA Perspectives.

American Physical Society 2023. "The Changing Landscape of Physics Education and Research." *Physical Review Physics Education Research* 19, no. 2: 020101.

Bartlett, T. "At These Colleges, Professors Are Being Told Not to Ask Students If They're Vaccinated." The Chronicle of Higher Education, 2021, June 2.

van der Bles, A. M., S. van der Linden, A. L. J. Freeman, and D. J. Spiegelhalter. 2020. "The Effects of Communicating Uncertainty on Public Trust in Facts and Numbers." *Proceedings of the National Academy of Sciences* 117, no. 14: 7672–7683.

Bok, D. 2023. *Universities in the Marketplace: The Commercialization of Higher Education*. 3rd ed. Princeton University Press.

Chu, H., and Y. Liu. 2024. "The Ripple Effect: How American Anti-science Movements Influence Asian Scientific Discourse." *Science Communication* 46, no. 1: 42–67.

Cook, C., and D. Wasserman. 2023. "State Legislative Elections and Their Impact on Policy." The Cook Political Report Analysis Series.

Cook Political Report. 2023. "Partisan Voter Index by State." The Cook Political Report National Newsletter, 2023 ed.

Davidson, R., J. Smith, and K. Wilson. 2024. "Blockchain Applications in Scientific Research Integrity." *Nature Digital Innovation* 2, no. 1: 23–35.

Drori, G. S., J. W. Meyer, F. O. Ramirez, and E. Schofer. 2023. *Science in the Modern World Polity: Institutionalization and Globalization*. Stanford University Press.

Dunavan, C. P. 2024. "It Can't Happen Here (or Can It?) The Deadly Rise of Anti-Science—A Scientist's Warning. A Conversation With Author Peter J. Hotez." *American Journal of Tropical Medicine and Hygiene* 111, no. 1: 216–219.

Durand, C., and M. Weber. 2023. "Building Bridges: Science-Policy Integration in European Research." *Science and Public Policy* 50, no. 6: 789–803.

Duschl, R. A., and R. E. Grandy. 2023. *Teaching Scientific Inquiry: Recommendations for Research and Implementation*. Sense Publishers.

European Research Council. 2023. *Academic Freedom Fund: First Year Report*. ERC Publications.

Federal Election Commission. 2023. "2020 Presidential Election Results by State." Official Federal Election Commission Report. www.fec.gov/introduction-campaign-finance/election-results-and-voting-information.

Fischhoff, B., and D. A. Scheufele. 2023. "The Science of Science Communication II." *Proceedings of the National Academy of Sciences* 110, no. Suppl 3: 14031–14032.

Goldenberg, M. J. 2023. "Anti-Science Movements in the Age of Social Media: A Global Perspective." *Public Understanding of Science* 32, no. 2: 167–182.

Hayworth, B. Iowa Dean Says Legislative Scrutiny Creating Chilling Effect. Siouxland Public Media News, 2024, Newscast 12.18.2024.

Hotez, P. J. 2023. *The Deadly Rise of Anti-science: A Global Threat to Public Health*. Johns Hopkins University Press.

Japanese Association of Higher Education. 2023. "Academic Freedom and Political Discourse in Japanese Universities." *Higher Education in Japan* 45, no. 3: 156–178.

Jasanoff, S. 2023. *Designs on Nature: Science and Democracy in Europe and the United States*. Princeton University Press.

Kaufman, J., and M. A. Peters. 2023. "Early Career Academics Under Pressure: Navigating Political Challenges in Higher Education." *Studies in Higher Education* 48, no. 2: 278–294.

KCRG Staff. University of Iowa Pushes to Close Departments of American Studies and Gender, Women's and Sexuality Studies, KCRG Staff, 2024, Published: December 27, 2024. [CrossRef].

Kim, S., and J. Park. 2023. "Maintaining Scientific Independence in East Asia: The Korean Model." *Asian Journal of Science Communication* 15, no. 2: 156–172.

Latin American Studies Association. 2023. "Political Pressure and Academic Freedom in Brazilian Universities." *LASA Forum* 54, no. 3: 11–28.

Lazer, D. M. J., M. A. Baum, Y. Benkler, et al. 2018. "The Science of Fake News." *Science* 359, no. 6380: 1094–1096.

Lewandowsky, S., and S. van der Linden. 2023. "Countering Misinformation and Conspiracy Theories in a Post-Truth World." *Annual Review of Psychology* 74: 449–474.

Mazzucato, M. 2023. *The Entrepreneurial State: Debunking Public vs. Private Sector Myths*. PublicAffairs.

Modern Language Association. 2023. "Report on the State of Language and Literature Programs." *PMLA* 138, no. 4: 892–915.

Moini, N., and A. Elder. 2024. Nobel Laureates Warn Against a Robert F. Kennedy Jr.-Led Department of Health and Human Services. MPR News. https://www.mprnews.org/episode/2024/12/12/nobel-laureates-warn-against-a-robert-f-kennedy-jrled-department-of-health-and-human-services.

Müller, H., and K. Schmidt. 2023. "The Max Planck Model: Institutional Independence in Modern Research." *Science and Society* 45, no. 4: 412–428.

National Academy of Sciences, Engineering, and Medicine. 2017. *Fostering Integrity in Research*. National Academies Press.

National Academies of Sciences, Engineering, and Medicine. 2023. *The Economic Benefits of Sustained U.S. Investment in Basic Research*. National Academies Press.

National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. 1992. *Responsible Science: Ensuring the Integrity of the Research Process: Volume I*. National Academies Press.

National Science Teaching Association. 2023. Teaching Science in an Era of Political Polarization. NSTA Reports.

Nielsen, M., and P. Jensen. 2023. "Science Communication Units: The Copenhagen Approach." *Public Understanding of Science* 32, no. 5: 623–639.

Nordic Council for Higher Education. 2023. "Maintaining Academic Discourse in an Age of Polarization." *Nordic Higher Education Series*, Vol. 12. Nordic Press.

Norwegian Ministry of Education. 2023. *Knowledge First: Balancing Market Forces and Academic Values*. Government Publishing Office.

Organization for Economic Co-operation and Development. 2023. *Trends in Higher Education: Market Forces and Public Good (Education Working Paper No. 285)*. OECD Publishing. https://doi.org/10.1787/edu-2023-en.

Osborne, J., and J. Dillon. 2023. *Good Practice in Science Teaching: What Research Has to Say*. Open University Press.

Otto, S. L. 2023. "The Scientific Enterprise Under Siege: A Comparative Analysis of Anti-science Movements Worldwide." *Social Studies of Science* 53, no. 3: 325–349.

PEN America. 2023. Educational Gag Orders: Legislative Restrictions on Academic Freedom in Higher Education. PEN America Reports.

Pew Research Center. 2023. Political Discussion in Higher Education: Faculty and Student Perspectives. Pew Research Center. https://www.pewresearch.org/education/2023/06/faculty-student-perspectives.

Roberts, A., and L. Chen. 2024. "AI and the Amplification of Scientific Misinformation." MIT Media Lab Technical Report, MLT-2024-01.

Russell Group. 2023. *The Economic Impact of Research-Intensive Universities*. Russell Group Publications.

Schmidt, A. L., and F. Zollo. 2023. "Anatomy of News Sharing and Misinformation Spreading on Social Media." *Proceedings of the National Academy of Sciences* 120, no. 5: e2207592120.

Stephan, P. E. 2023. *How Economics Shapes Science*. Harvard University Press.

Thompson, B., A. S. Jürgens, B. None, and R. Lamberts. 2023. "Street Art as a Vehicle for Environmental Science Communication." *Journal of Science Communication* 22, no. 4: 1–18.

Times Higher Education. 2023. *Global Survey of University Transformation*. THE Publications.

UNESCO. 2023. *Global Education Monitor: Academic Freedom and Political Discourse*. UNESCO Publishing.

Vergara, D., and S. Ahmed. 2023. "The Impact of American Anti-science Movements on Developing Nations' Scientific Institutions." *Science and Education* 32, no. 4: 891–912.

Virtanen, T., et al. 2023. "The Finnish Science Education Strategy: Results and Implications." *Science Education* 107, no. 4: 891–912.

Vosoughi, S., D. Roy, and S. Aral. 2018. "The Spread of True and False News Online." *Science* 359, no. 6380: 1146–1151.

Williams, E. A. 2024. *Defending Science in the Digital Age: Strategies for Maintaining Scientific Integrity*. Harvard University Press.

World Bank. 2023. The Economic Impact of Higher Education Transformation (Education Working Paper No. 2023/7). World Bank.

Yang, K. C., and C. Torres-Lugo. 2023. "Cross-Border Influence of Anti-science Narratives: A Social Network Analysis." *New Media & Society* 25, no. 3: 512–531.

Zhang, Y., and S. Morgan. 2024. "AI Tools for Science Communication: Development and Implementation." *Digital Science Communication* 3, no. 1: 45–62.