THE JAMES G. MARTIN CENTER FOR ACADEMIC RENEWAL

The Scientific Mind: an Update of the 1988 Survey *Sketches of the American Scientist*

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December 8, 2025

EXECUTIVE SUMMARY

Scientists tend to be on the cutting edge of knowledge—after all, their primary function is to discover new knowledge. Furthermore, their ideas, theories, and beliefs often become important policies. Their ideas and beliefs are not static, but constantly changing, influenced by education, their own work, and society at large. It is of considerable value to know how they think, and how their ideas evolve.

In 1988, former University of North Carolina at Charlotte geographer Jack Sommer, with help from the scientific honor society Sigma Xi, conducted a survey titled *Sketches of the American Scientist*. The survey focused on scientists' attitudes on a wide range of issues, including what scientists think about their jobs, the nature and role of the scientific enterprise, politics, their relationship to the government, and ethical problems.

In 2025, Sommer decided it was a good time to re-examine these topics. He connected with the James G. Martin Center for Academic Renewal to perform the new survey and the subsequent presentation of the findings and analysis. Sigma Xi again provided contacts to its membership and Sommer and Martin Center research and policy fellow Shannon Watkins prepared the survey. Once the results were in, senior fellow Jay Schalin analyzed the data and wrote the final report.

The results indeed suggest changing attitudes by the scientific profession. Some are about how science should be conducted; for instance, scientific researchers increasingly favor a team approach rather than individual investigation.

Politically, there were indications that a dramatic shift to the left has occurred. Additionally, almost one-quarter of the respondents expressed concern about being able to speak freely about their areas of expertise—and such concerns are more common among younger scientists. Even more unsettling, anti-science attitudes such as the belief that anti-meritocratic practices such as "Diversity, Equity, and Inclusion" have become the norm in much of the scientific world, particularly academia. And only 59 percent or respondents affirmed the value of "disseminating" research that conflicts with the prevailing consensus—it seems shocking that a single scientist would not see the value in exposing original ideas and theories.

The report reveals other indications that suggest the open atmosphere of scientific exploration that has led to so much advancement in the last few centuries may be waning. It may be that science itself may be heading into a period of questionable practices and increasing doubt that it represents the best-known truths. This report is both a call for further investigation into this possibility and a

suggestion that scientific enterprises, including academia, alter their policies to restore the spirit of open inquiry.

INTRODUCTION

We live in an age dominated by science and technology. Given such influence, perhaps we should be concerned about how scientists perceive the world and their roles in it. What do scientists think about their jobs, the nature and role of the scientific enterprise, politics, their relationship to the government, and ethical problems? After all, scientists themselves are the indispensable element in the conduct of science and are highly influential in scientific policies.

In 1988, the scientific honor society Sigma Xi commissioned a survey titled *Sketches of the American Scientist*, which focused on scientists' attitudes on a wide range of issues. The survey and subsequent report were the work of former University of North Carolina at Charlotte geographer Jack Sommer. In 2025, Sommer decided it was a good time to re-examine these topics. He sought the help of the James G. Martin Center for Academic Renewal to again solicit the opinions of scientists. The Martin Center originally collaborated with Sigma Xi just as Sommer had previously done. Sigma Xi provided the Martin Center with contacts to 1,432 of its members across the U.S., who were asked to participate in the survey. They are educated in many different areas of science and employed in many different sectors of the economy.

One problem with the 2025 survey, which was less severe in 1988, was a low participation rate. Only 169 of the scientists and engineers contacted responded. While this was sufficient in most cases to derive general results, there were frequently too few responses to derive conclusions from more granular results according to specific characteristics.

The first seven questions describe the characteristics of the respondents. They are: area of expertise, type of institution attended, kind of employer, most-frequent work-related duties, source of research funding, gender, and age.

The final 19 survey questions are issue-related. Survey subjects were asked to give answers according to a list of choices. Of course, not all of the questions in the surveys from 1988 and 2025 line up exactly. Issues appear and disappear over the decades, and the questions in the newer survey reflect the changing times. But there is enough overlap between the two surveys so that important shifts in the attitudes of scientists are revealed.

Despite its sample limitations, this survey provides great insight into the minds of the modern scientist. The results speak for themselves.

CHARACTERISTICS

Respondents were asked the following seven questions that describe their personal characteristics.

1. *Which of the following areas best describes your primary field of current scientific investigation?*

	Response Count	Response Percentage
Agricultural & soil sciences	5	2%
Biological sciences	37	22%
Engineering sciences & applied sciences and technologies	26	15%
Earth & environmental sciences & natural resources	17	10%
Medical & health sciences	40	23%
Mathematics & computer sciences	9	5%
Chemical sciences	5	2%
Physical sciences	9	5%
Social and behavioral sciences	8	4%
Other	12	7%
Total Responses	168	-

2. *From which type of institution did you receive your highest scientific degree?*

	Response Count	Response Percentage
Public	108	63%
Private	61	36%
Total Responses	169	-

3. *Which of the following categories best describes your current primary employment?*

	Response Count	Response Percentage
Academic (tenure-track)	32	19%
Academic (non-tenure-track)	26	15%
Government	8	4%
Private Sector	22	13%
Unemployed and looking for work	1	0%
Retired	73	43%
Other	6	3%
Total Responses	168	-

4. *Please identify the work-related activities you most engage in each week.*

	Response Count	Response Percentage
Administration & compliance	20	14%
Policy analysis and development	8	5%
Professional practice/consulting	36	25%
Research as an investigator	81	57%
Research management	21	14%
Teaching	49	34%
Technology development	17	12%
Total Responses	232*	-

* Some respondents gave multiple answers.

5. *What has been your principal source of research support during the past five years?*

	Response Count	Response Percentage
Federal agency	44	31%
State agency	6	4%
Private Foundation	12	8%
University	28	20%
Personal finance	49	35%
Total Responses	139	-

6. *Gender*

	Response Count	Response Percentage
Male	128	77%
Female	37	22%
Total Responses	165	-

7. *Age*

	Response Count	Response Percentage
Under 30	5	3%
30-39	31	18%
40-49	5	3%
50-59	2	1%
60 and over	122	73%
Total Responses	165	-

SURVEY RESULTS

Participants responded to the following 19 questions.

8. *In my experience I have observed that teaching quality suffers due to research/publication demands.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	15	8%
2 (Disagree Somewhat)	38	22%
3 (Neither Agree nor Disagree)	51	30%
4 (Agree Somewhat)	58	34%
5 (Agree Emphatically)	6	3%
Mean	3.01	-
Median	3	-
Total Responses	168	-

Today's scientists were somewhat equivocal about this proposition. Few seemed to feel strongly about it, with only 15 out of 168 responses disagreeing emphatically and only 6 agreeing emphatically. In all, 30 percent disagreed, 37 percent agreed, and 30 percent had no opinion. Even so, it is likely that teaching, in at least some cases, indeed suffers because of teachers' research demands.

9. *Open-source science (where science is freely and publicly available) is better than placing research behind journal paywalls.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	3	1%
2 (Disagree Somewhat)	7	4%
3 (Neither Agree nor Disagree)	25	14%
4 (Agree Somewhat)	55	32%
5 (Agree Emphatically)	78	46%
Mean	4.18	-
Median	4	-
Total Responses	168	-

The respondents were heavily inclined to agree with the proposition, with 133 of 168 responses either being in agreement or emphatic agreement. This is true to the spirit of scientific discovery, which relies on openness to achieve new discoveries and better understanding.

10. *In my professional capacity, I feel responsible first to science and to the creation of new knowledge or products than to the concerns of citizens.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	9	5%
2 (Disagree Somewhat)	24	14%
3 (Neither Agree nor Disagree)	60	35%
4 (Agree Somewhat)	57	33%
5 (Agree Emphatically)	18	10%
Mean	3.3	-
Median	3	-
Total Responses	168	-

From one perspective, one would anticipate, and perhaps favor, the likelihood that scientists are focused on the truth and discovering new things. The "concerns of citizens" is another way of saying "politics," and those focused on truth should be wary about having their concern for citizens turned into a political agenda. Additionally, it is natural to expect that scientists, out of self-interest, would favor science over social concerns.

But we also fear the potential for "mad scientists" to create monstrosities such as viruses for which mankind has no defense. In this perspective, one would hope the concerns of citizens would outweigh the desire to explore such possibilities.

Because of these very important considerations, there is an undecided quality to the results, which were centered very slightly toward agreement. It would not be out of the ordinary for a scientist to change his or her answer over time or depending on particular situations.

Comparison to 1988 Study:

Agree emphatically: 17 percent

Agree in substance: 50 percent

Neither agree nor disagree: 12 percent

Disagree in substance: 17 percent

Disagree emphatically: 3 percent.

There has been a considerable shift over the decades away from pure scientific concerns. In 1988, 67 percent favored truth over social concerns; today the percentage is only 43. The shift toward social concerns went from 22 percent in 1988 to 29 percent today. This trend is in line with other questions in the survey that concern scientists' freedom to explore versus their social responsibilities. The biggest shift was in the tripling of the number of scientists who are noncommittal about the issue.

11. *The United States should be the primary beneficiary of scientific advances funded by taxpayers.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	10	6%
2 (Disagree Somewhat)	28	16%
3 (Neither Agree nor Disagree)	49	29%
4 (Agree Somewhat)	50	30%
5 (Agree Emphatically)	29	17%
Mean	3.36	-
Median	3	-
Total Responses	166	-

There was a slight preponderance of responses for agreement instead of disagreement. There could be any number of reasons for a disagreement response. A scientist may have ties to another country while working in the United States or may see him- or herself as some manner of "world citizen." Additionally, considerable research is aimed at solving problems in the rest of the world, such as cures for malaria or other tropical diseases that are exceedingly rare in the United States.

It may also be that some research, if successful, will benefit mankind generally rather than be confined within the boundaries of a single country. This could introduce a degree of uncertainty in a scientist's response to the proposition.

A question from the 1988 survey somewhat approximates the mirror opposite of this question. It read:

> *I believe that science transcends national concerns and any attempts to confine particular research efforts to a particular country will diminish the progress of science in that country as well as elsewhere.*
>
> Agree emphatically: 37 percent
>
> Agree in substance: 42 percent
>
> Neither agree nor disagree: 7 percent
>
> Disagree in substance: 10 percent
>
> Disagree emphatically: 3 percent.

Comparing the two surveys may reveal a huge shift away from the international perspective to the national. Forty-seven percent agree with the 2025 proposition. The same perspective, represented by disagreement in the 1988 survey, was favored by only 13 percent of the respondents. However, this movement toward the use of science to benefit the nation may be due to the inclusion of taxpayer funding by the government in the 2025 question; with that removed, as it was in the 1988 survey, the belief that science should remain an international enterprise is still likely to be overwhelmingly popular.

12. *Newspaper and television reporting on science issues in the United States is generally accurate and unbiased.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	18	10%
2 (Disagree Somewhat)	44	26%
3 (Neither Agree nor Disagree)	65	39%
4 (Agree Somewhat)	34	20%
5 (Agree Emphatically)	5	3%
Mean	2.78	-
Median	3	-
Total Responses	166	-

The responses were clustered around the neutral position, slightly favoring the view that the media is "generally accurate and unbiased." However, even a neutral answer suggests some skepticism toward media accuracy. Furthermore, the results may reflect the likelihood that both the scientists surveyed and the media share similar left-leaning opinions.

Granular data:

1. Tech developers disagreed with the proposition at much higher rates than the average for all respondents, 53 percent versus 36 percent.

13. *It is in the public interest to discourage the dissemination of the views of scientists who do not agree with reigning orthodoxies in scientific issues.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	42	25%
2 (Disagree Somewhat)	58	34%
3 (Neither Agree nor Disagree)	41	24%
4 (Agree Somewhat)	19	11%
5 (Agree Emphatically)	6	3%
Mean	2.33	-
Median	2	-
Total Responses	166	-

It is hard to imagine any serious scientist who would agree with such a statement. Science advances by the give and take between new discoveries and existing knowledge. This proposition essentially reduces the living, dynamic process of science to a dying, static "rule by consensus." Yet 14 percent were in some sort of agreement with the proposition, and another 24 percent were ambivalent—these results are surprising, and perhaps alarming.

Granular Data:

1. Earth and environmental scientists were less likely to agree: 48 percent versus a 59-percent average for all fields.

2. Scientists who got their highest degree from private institutions were more likely to disagree: fully 90 percent versus a 59 percent average for all fields. Conversely, scientists who got their highest degree from public institutions were more likely to disagree: 20 percent versus a 14 percent average for all fields.

3. Occupations that had higher tendencies to agree with the proposition were teaching, research management, and tech development: 26 percent, 25 percent, and 24 percent respectively, versus an average of 14 percent for all respondents. The results for teaching are especially noteworthy, since they will disseminate these views to newer generations.

4. There were differences between the sexes. Males disagreed at a slightly higher rate than females: 62 percent versus 54 percent. Females tended to agree at a much higher rate than males: 27 percent versus 11 percent.

5. There was a generational divide in the attitudes toward this proposition. Only two age cohorts responded in significant numbers: those between 30 and 39, and those who are at least 60. The younger group showed an alarmingly low tendency to disagree with the proposition—only 16 percent versus a 59 percent average for all ages. They also showed a stronger tendency to agree: 22 percent versus a 14 percent average for all age groups.

   Older respondents, on the other hand, disagreed at a 63 percent rate, slightly above the 59 percent average for all ages. They also agreed at a 12 percent rate, slightly lower than the 14 percent average.

14. *The promotion of diversity, equity, and inclusion (DEI) has contributed to the advancement of scientific research.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	10	5%
2 (Disagree Somewhat)	13	7%
3 (Neither Agree nor Disagree)	23	13%
4 (Agree Somewhat)	42	25%
5 (Agree Emphatically)	80	47%
Mean	4.01	-
Median	4	-
Total Responses	168	-

This proposition is highly revealing of respondents' political inclinations; scientists seem to be moving rapidly to the left. The fact that fully 72 percent of the respondents agreed and only 12 percent disagreed with this proposition is disturbing: DEI is anti-meritocratic, which is anti-science; it is aspirational, not empirical. Furthermore, these results are especially indicative of academia's one-sided political climate.

Granular data:

1. Both biologists and physicists agreed at a considerably higher rate than the average of 72 percent: biologists at 95 percent and physicists at 88 percent.

2. Men and women had differing attitudes of the proposition, as expected. Men disagreed with the proposition 16 percent of the time, whereas not a single woman did so. Conversely, 92 percent of women agreed, while only 67 percent of men did.

Comparison to 1988 Study:

> There is no question that explicitly compares the political leanings of scientists in the 2025 study as there was in the 1988 version. However, attitudes toward DEI may be the best proxy for political beliefs in the more recent study. As a general rule, those favoring DEI tend to lean left; those against lean right. If so, the findings are stark. In 1988, scientists were largely moderate or centrist, with the following results:
>
> > Strong left: 4 percent
> >
> > Moderate left: 39 percent
> >
> > Centrist: 15 percent
> >
> > Moderate right: 35 percent
> >
> > Strong right: 4 percent
> >
> > Libertarian: 2 percent
> >
> > Other: 2 percent.

Additionally, in the 1988 study, 53 percent of scientists indicated their intention to vote for the Democratic candidate, Michael Dukakis, with 36 intending to vote for the Republican, George Bush, Sr. While the results slightly leaned to the left, there was no overwhelming imbalance of opinions as there is today.

The 2025 study, on the other hand, shows that scientists are six times more in favor of DEI, 72 percent to 12 percent. This suggests that there has been a dramatic shift in scientists' political attitudes in the intervening years.

15. *The proper role of government with regard to the funding of science is to define broadly what should be investigated, thereby providing scientists with a "research agenda."*

	Response Count	Response Percentage
1 (Disagree Emphatically)	37	22%
2 (Disagree Somewhat)	49	29%
3 (Neither Agree nor Disagree)	36	21%
4 (Agree Somewhat)	35	20%
5 (Agree Emphatically)	11	6%
Mean	2.61	-
Median	2	-
Total Responses	168	-

There was more disagreement with the proposition than agreement, 51 percent versus 26 percent. However, it is difficult to draw any conclusions about *why* respondents reject the government proposing an agenda, merely that they desire independence from the government.

Granular data:

1. Biologists overwhelmingly disagreed with the proposition, at a rate of 70 percent versus 51 percent of all respondents.
2. Only 16 percent of those whose primary function is teaching agreed with the proposition.
3. Only 32 percent of those scientists whose research is funded by the federal government disagreed with the proposition.
4. There was a slight disparity between men and women. More females disagreed with the proposition than males: 62 percent to 47 percent.
5. There was also some difference in opinions between age groups. Younger respondents, in the age 30-39 cohort, disagreed at a higher rate than older respondents in the 60+ cohort, 58 percent to 48 percent. Oddly more younger respondents agreed than older, 32 percent to 26 percent. More older respondents than younger ones were ambivalent, however: 25 percent to 10 percent.

Comparison to 1988 Study:

Answers to the same question in 1988 were:

Agree emphatically: 4 percent

Agree in substance: 22 percent

Neither agree nor disagree: 14 percent

Disagree in substance: 34 percent

Disagree emphatically: 26 percent.

There were similar responses to both surveys, with slightly more disagreement in 1988.

16. *Research funds and monies are tied too closely to prevailing political priorities and fashions so government should not be involved in targeting research projects for federal funding.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	5	3%
2 (Disagree Somewhat)	23	13%
3 (Neither Agree nor Disagree)	34	20%
4 (Agree Somewhat)	55	33%
5 (Agree Emphatically)	49	29%
Mean	3.72	-
Median	4	-
Total Responses	166	-

A strong majority of respondents (62 percent) agreed with the proposition. Rather than a statement of the prevailing politics of the day, it may be more a statement of researchers' desire for independence.

Granular data:

1. Medical professionals were frequently against the proposition: 30 percent disagreed versus 16 percent for all respondents.

2. Non-tenured faculty tended to disagree at a much higher-than-average rate of 31 percent.

3. There was some disparity between men and women. Men disagreed 14 percent of the time, whereas women disagreed almost twice as often (27 percent).

17. *When government funds basic/fundamental research, it should not require a specific outcome because no scientist can guarantee a result in advance of doing the research.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	0	0%
2 (Disagree Somewhat)	5	2%
3 (Neither Agree nor Disagree)	5	2%
4 (Agree Somewhat)	33	19%
5 (Agree Emphatically)	124	74%
Mean	4.65	-
Median	5	-
Total Responses	167	-

This proposition is so fundamental to the scientific enterprise that the only surprise is that 4 percent did not agree. The ability of that 4 percent to perform scientific research must be called into question.

Granular data:

1. There was a slight difference in the responses for different age cohorts. The younger cohort (ages 30-39) only agreed with the proposition 87 percent of the time, whereas the older cohort (60+) agreed 95 percent of the time. Although the size of the sample may have some effect on the discrepancy, it may be that generational perspectives are changing.

Comparison to 1988 Study:

Answers to the same question in 1988 were:

Agree emphatically: 56 percent

Agree in substance: 36 percent

Neither agree nor disagree: 3 percent

Disagree in substance: 4 percent

Disagree emphatically: 1 percent.

These results align with those of the 2025 survey, although the agreement was slightly less emphatic than today.

18. *From what I know of scientific discovery it is more a serendipitous result of individual insight and circumstance than it is a textbook methodological treatment of a subject area by a team.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	9	5%
2 (Disagree Somewhat)	29	17%
3 (Neither Agree nor Disagree)	46	27%
4 (Agree Somewhat)	63	37%
5 (Agree Emphatically)	21	12%
Mean	3.35	-
Median	3.5	-
Total Responses	168	-

This is an important discussion topic, one that gets to the very heart of the creative process. Is the free inspiration of individuals more creative than the cumulative brain power of a team working together? It may surprise many that the history of major discoveries favors the former. The survey also favors the individual researcher, with 49 percent in agreement with the proposition and 22 percent disagreeing.

Granular data:

1. Earth and environmental scientists agreed at a higher than average rate: 71 percent versus 49 percent for all respondents.
2. Tenured faculty disagreed at a high rate, 37 percent.
3. Retired scientists tended to agree at a high rate: 67 percent, as did those employed in private industry (66 percent).

Comparison to 1988 Study:

Answers to the same question in 1988 were:

Agree emphatically: 23 percent

Agree in substance: 51 percent

Neither agree nor disagree: 12 percent

Disagree in substance: 13 percent

Disagree emphatically: 2 percent.

There has been a large shift away from agreement with the proposition that individual effort and intuition play larger roles in scientific breakthroughs than process-oriented team efforts. In 1988, 74 percent chose individual efforts, whereas in 2025 only 49 percent did so. This could be because today's team-oriented scientific processes are better at discovering small, incremental advances. It could also be because prospective scientists are educated to be part of the team process more than as individual explorers.

19. *Excluding clear negligence or minor mistakes that can be charitably dismissed (but not condoned), I have personal knowledge of fraud (e.g. falsifying data, misreporting results, plagiarism) on the part of a professional scientist in the last five years.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	96	57%
2 (Disagree Somewhat)	31	18%
3 (Neither Agree nor Disagree)	18	10%
4 (Agree Somewhat)	17	10%
5 (Agree Emphatically)	4	2%
Mean	1.81	-
Median	1	-
Total Responses	166	-

Is the fact that 12 percent of respondents are personally aware of fraud occurring in the last five years good or bad? While not an everyday occurrence, there is still considerable fraud occurring to achieve such a number.

Granular data:

1. Knowledge of fraud was most common in the medical (21 percent) and biology (17 percent) fields. Perhaps this is because there are often huge economic incentives for successful research in these fields.

2. Academia seems to be where ethical problems are the most likely to occur. Tenured faculty (29 percent) and non-tenured faculty (31 percent) reported knowledge of fraud the most frequently.

3. Those scientists in administrative (25 percent) and policy positions (25 percent) also tended to have knowledge of fraud more than the average for all respondents (12 percent). This may be due to the fact that fraud cases would come to their attention as a function of their jobs.

4. Men also tended to be more aware of fraud than women: 15 percent to 6 percent.

5. One disturbing trend is that younger scientists were more personally aware than their older counterparts. The rate for scientists in the age 30-39 cohort was a whopping 29 percent, whereas for those in the 60+ cohort the rate was only 8 percent.

Comparison to 1988 Study:

Answers to the same question in 1988 were:

Agree emphatically: 9 percent

Agree in substance: 10 percent

Neither agree nor disagree: 11 percent

Disagree in substance: 17 percent

Disagree emphatically: 52 percent.

In 1988, 19 percent said they were aware of unethical behavior by colleagues, versus 12 percent today. There was also a big drop in those who emphatically agreed, from 9 percent to 2 percent. So things may be moving in the right direction in this issue, although the sample size limits the ability to draw firm conclusions.

20. *The development of potentially dangerous technology should be decided, primarily, within the scientific and engineering community.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	23	13%
2 (Disagree Somewhat)	55	32%
3 (Neither Agree nor Disagree)	40	23%
4 (Agree Somewhat)	32	19%
5 (Agree Emphatically)	18	10%
Mean	2.8	-
Median	3	-
Total Responses	168	-

The results were somewhat mixed, although weighted toward "disagree" by a 45 percent to 29 percent margin. This may be a welcome sign of prudence; scientists may realize they can be too close to the issue to make unbiased decisions. For instance, some may even have financial incentives to proceed with dangerous technology. Such decisions may be best handled above the expert level, since all of society has a stake in the decision whether to proceed with potentially dangerous technology.

Granular data:

1. Those who are employed in the private sector were highly likely to favor that scientists themselves make the decisions about dangerous technology, with 44 percent doing so versus 29 percent of all respondents.

2. Only 12 percent of those employed in the technology development sector disagreed with the proposition that scientists should make the decisions about dangerous technology. There may be an element of self-interest at play here.

3. Those who are employed in some sort of "practice," such as medical doctors, were very likely to want scientists to make the decisions, at a rate of 50 percent versus 29 percent for all respondents.

4. There was an age gap between those who favor scientists making crucial decisions about dangerous technology and those who do not. The younger cohort with a significant number of responses, those in their 30s, favored the proposition at a lower rate (35 percent) than

those who are at least 60 years old (53 percent). This could signal a growing mistrust of "experts" by younger people, particularly after the 2020 Covid epidemic.

21. *Increased human-induced atmospheric carbon dioxide is the main cause of climate change.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	5	2%
2 (Disagree Somewhat)	10	5%
3 (Neither Agree nor Disagree)	21	12%
4 (Agree Somewhat)	39	23%
5 (Agree Emphatically)	93	55%
Mean	4.22	-
Median	5	-
Total Responses	168	-

There are not a lot of surprises here. Academia and the government have treated this issue in dogmatic fashion: to question man-made climate change is to be seen as a heretic. A few holdouts exist, but the response is overwhelmingly in favor of the proposition: 78 percent for and 7 percent against.

The results of this question are further evidence corroborating that the political inclinations of scientists have moved dramatically to the left since 1988. Those who favor an anthropogenic basis for climate change tend to be on the left politically, whereas those who reject that belief are generally on the political right.

22. *Artificial Intelligence's (AI's) potential negative impacts outweigh its potential positive impacts.*

	Response Count	Response Percentage
1 (Disagree Emphatically)	11	6%
2 (Disagree Somewhat)	42	25%
3 (Neither Agree nor Disagree)	80	47%
4 (Agree Somewhat)	25	14%
5 (Agree Emphatically)	9	5%
Mean	2.87	-
Median	3.00	-
Total Responses	167	-

It appears that many scientists are not fully decided about this topic, since the responses lean toward the neutral answer. The issue may be too new for them to have developed strong opinions either way.

Granular data:

1. A majority of physicists (55 percent) disagreed with the proposition, favoring a rosy outlook for AI's eventual impact, as opposed to 31 percent for all respondents.
2. Half of scientists employed in the private sector also saw a positive future for AI.
3. Younger scientists were slightly more dubious about AI's benefits than their older colleagues. The 30-39 age groups agreed that the negative aspects outweigh the positive at a 29 percent rate, whereas those aged 60 or older agreed only 17 percent of the time.

23. *I am able to speak freely on public policy issues within my particular area of expertise without prior approval from my employer. (Retired persons and those not currently employed, please indicate your thoughts regarding your former employer(s).*

	Response Count	Response Percentage
1 (Disagree Emphatically)	14	8%
2 (Disagree Somewhat)	24	14%
3 (Neither Agree nor Disagree)	24	14%
4 (Agree Somewhat)	46	27%
5 (Agree Emphatically)	59	35%
Mean	3.67	-
Median	4	-
Total Responses	167	-

The results are generally positive, with 62 agreeing that they have some latitude to speak freely, versus only 22 percent who claimed to be somewhat restricted in their speech. Still, this means that nearly a quarter of the scientists in the survey fear repercussions for speaking freely.

Granular data:

1. Not surprisingly, government workers (88 percent) and those employed in the private sector (46 percent) felt their speech was restricted at much higher rates than in other sectors.
2. Also as expected, tenured academics, who have strong academic freedom rights, expressed the greatest ability to speak freely, with 72 percent in agreement with the proposition and only 9 percent disagreeing.
3. Practitioners (36 percent) were also likely to feel that their speech rights are hampered.
4. Those scientists who receive their research funding from private sources also felt limited in their ability to speak freely (41 percent).
5. Women in science reported less freedom to speak than men, 35 percent to 19 percent.
6. There are indications that younger scientists feel more constrained in their speech than older ones. Those scientists between the ages of 30 and 39 disagreed with the proposition 26 percent of the time, versus 20 percent for those at least 60 years old. Older scientists agreed with the proposition at a much higher rate (66 percent) than did their younger counterparts (49 percent).

24. *Please identify the most important issue facing scientific researchers today.*

	Response Count	Response Percentage
Lack of public understanding of science and technology	49	29%
Interruptions in research funding	43	25%
Over-politicization of research	44	26%
Decline of student interest in science and technology	5	2%
Bureaucratic accountability, management and red tape	12	7%
Emphasis on funding applied research over basic research	4	2%
Fraudulent development of data and its use by scientists	4	2%
Lack of interdisciplinary exposure	3	1%
Other	4	2%
Total Responses	168	-

Three answers received the most attention. "Lack of public understanding of science and technology" received 29 percent, "Over-politicization of research" received 26 percent, and "Interruptions in research funding" received 25 percent. Lack of public understanding may be related to issues such as climate change and Covid-19, for which a large segment of the population has rejected the consensus of scientific "experts." Over-politicization could go several ways; it is likely that those concerned are on the political right and concerned about the gatekeeping of any ideas outside the liberal academic echo chamber. Or it could be from the political left due to fear of the current Republican administration. Interruptions in funding may be a personal issue for the respondents, particularly those whose jobs rely on government funding of research.

Granular data:

1. Responses of "Lack of public understanding of science" were frequent among biologists, at 41 percent.

2. Retired scientists considered lack of public understanding of science to be a more important issue (44 percent) than did those still in the workforce. Those employed in the private sector were the least concerned about this (9 percent), most likely because government funding tends to be more sporadic and dependent on the political winds.

3. Non-tenured faculty (38 percent) were the most likely to cite interruptions in research funding as their biggest concern. This is understandable, since many are hired as researchers,

and their jobs depend on research grants. Retired faculty were understandably the least concerned, at 16 percent.

4. Those employed in the private sector (36 percent) were highly likely to worry about the politicization of scientists.

5. Among specific occupations, administrators (45 percent) and tech developers (41 percent) were more worried about the politicization of science.

6. Women feared interruption of research funding more than men, 41 percent to 22 percent. On the other hand, men were more worried about politicization than women, 29 percent to 16 percent.

7. Older scientists in the 60+ age group were much more worried (34 percent) about the public misunderstanding science than their younger counterparts in the 30-39 cohort (13 percent).

8. On the other hand, younger scientists (45 percent) were far more concerned about interruptions in funding than older ones (22 percent). This is as expected, since older scientists tend to be retired or in more stable positions than younger ones.

9. Older scientists (29 percent) were slightly more concerned than their younger peers (19 percent) about the politicization of science. This may be because older generations lean to the right politically more often than their younger counterparts, at a time when the political left is dominant on campuses and in the government.

Comparison to 1988 Study:

> In the 1986 Survey of Scientists, the issues listed below were regarded as the most important ones facing scientists:
>
> > Lack of public understanding of science: 40 percent
> >
> > Over-politicization of research: 24 percent
> >
> > Interruptions in funding for research: 21 percent
> >
> > Lack of inter-disciplinary training: 10 percent
> >
> > Other: 5 percent.

The results approximate those of 2025 (although the latter survey had many more choices). The major difference is that concern about the lack of interdisciplinary training has almost disappeared. This should be expected, as academia has placed much emphasis on introducing interdisciplinary education at the graduate level in recent decades.

25. *Please identify your greatest concern with the research awards process.*

	Response Count	Response Percentage
Award processes work well and I have no major concerns	45	27%
Reviews are marred by cronyism, personal networks with favoritism, or insider politics	45	27%
Original, non-mainstream ideas are unlikely to be funded	43	26%
Reviews are perfunctory, cursory, or non-substantive	6	3%
Reviews are not given sufficient weight in award decisions	3	1%
Reviews are conflicting	6	3%
Original ideas are leaked or stolen	1	0%
Other	13	8%
Total Responses	162	-

Three answers dominated, totaling 80 percent of the responses. They were:

- "Awards processes work well and I have no major concerns." (27 percent)
- "Reviews are marred by cronyism, personal networks, personal networks with favoritism, or insider politics." (27 percent)
- "Original, non-mainstream ideas are unlikely to be funded." (26 percent)

That only 27 percent see the process as working well is a cause for concern. Especially important is that so many are concerned that original ideas are often rejected. This may suggest that American science is calcifying and sclerotic, failing to recognize the need for big breakthroughs while only funding "sure thing," value-added projects.

Granular data:

1. Responses of "Awards processes work well" were high in biology, with 41 percent.

Comparison to 1988 Study:

Answers to the same question in 1988 were:

Reviews are marred by cronyism, old boys networks, and insider politics: 32 percent

Original, non-mainstream ideas are unlikely to be funded: 27 percent

Reviews are perfunctory, cursory, or non-substantive: 9 percent

I think peer review works well as it is: 8 percent

Reviewers are not experts in applicant's fields: 8 percent

Reviews are conflicting: 5 percent

Original ideas are somewhat "appropriated" or "leaked" by a reviewer or program officer: 5 percent

Other: 1 percent.

One major change is that the percentage of scientists who think the peer-review process works well increased from 8 percent to 27 percent. This is a surprising result, as peer review has been much criticized in recent years. The reasons for this were not revealed by the surveys.

26. *Lately there has been much concern over research results that are unable to be replicated by other scientists. Please identify the most important factor that supports this concern.*

	Response Count	Response Percentage
Poor understanding of statistical methodology	16	9%
Journal publication bias for positive results	34	20%
Willingness to manipulate data to produce desired outcomes	31	18%
Carelessness in research design	29	17%
Lack of transparency in the research process	26	15%
Doctrinaire adherence to disciplinary orthodoxies	4	2%
Support for ideological uniformity or conformity	2	1%
Concern is not warranted	10	6%
Other	12	7%
Total Responses	164	-

This question elicited a very broad range of responses. The most common response—"Journal publication bias or positive results"—was only 20 percent of the total. The next was "Willingness to manipulate data to produce desired outcomes," with 18 percent of all responses, then "Carelessness in research design" with 17 percent. Clearly, there are many problems with research verification today.

Granular data:

1. Male scientists were more concerned by "carelessness in research design" than women by a 20 percent to 5 percent margin.

2. Women, on the other hand, were more concerned about a "lack of transparency" by 32 percent versus 11 percent for men.

3. Younger scientists in the 30-39 age cohort were also more concerned about the lack of transparency than their older (60+) colleagues by a 26 percent to 14 percent margin.

ANALYSIS

When respondents were asked about their biggest concerns for science, 26 percent cited the "over-politicization of research." The political moderation of scientists has historically been seen as a bulwark against the encroachment of radical left politics in academia.

The survey, however, reveals that this moderation has become a myth and that there has been a huge shift to the political left by scientists. In the 1988 survey, scientists were largely centrist or moderate in either direction. Today, although respondents were not directly asked about their political leanings in the 2025 survey, proxy questions such as those concerning DEI and climate change show they overwhelmingly align with positions identified with the political left. (This leftward movement corroborates the findings of other surveys with larger samples.[1]) Among tenured faculty, 69 percent believe DEI advances science versus 19 percent who believe the opposite. There is an even greater imbalance on the question of anthropogenic climate change: 78 percent believe man's activities are the main cause of climate change versus only 9 percent who reject that hypothesis. Although academic scientists may not yet be as radical as their colleagues in the humanities and social sciences, they still overwhelmingly favor the left on these issues.

Furthermore, if the trend of the scientist population becoming more female continues (from 15 percent in 1988 to 22 percent in 2025), the shift to the left may be accelerated. For instance, men disagree with the proposition that DEI improves science 16 percent of the time, whereas no women do. Conversely, 92 percent of women agree, while only 67 percent of men do.

Scientists today generally feel they are able to speak freely about their areas of expertise. However, 22 percent disagree; it may be that one's ability to speak freely depends on whether one's views agree with the general consensus. Additionally, restrictions on free speech may be growing more severe, as

older scientists feel they can speak their minds freely at a much higher rate (66 percent) than did their younger counterparts (49 percent).

Some of the data for the question concerning silencing unorthodox views are troubling. Clearly, the scientific enterprise primarily advances through the dissemination of new ideas that may conflict with accepted norms. Yet 14 percent of all respondents agreed that unorthodox views that stray from the accepted consensus should be "discouraged." Furthermore, 26 percent of those whose occupations are primarily teaching felt the same, meaning that this anti-science view of silencing any original ideas is likely to be spread to new generations of scientists.

Women tended to agree with the proposition, suggesting that unorthodox views be repressed at a much higher rate than men: 27 percent to 11 percent. But more disturbing is the generational divide; 22 percent of respondents in the 30-39 age cohort agreed with the proposition, as opposed to 14 percent average for all age groups, while 49 percent disagreed, versus 59 percent for all respondents. Responses by older respondents over age 60 were the opposite, disagreeing at 63 percent and agreeing only 12 percent of the time. This might suggest that more scientists will favor this very "anti-science," truth-by-consensus proposition in the future as the older ones "age out."

The relationship between the scientist and the government appears to be constant, with large majorities wishing that the government would take a hands-off approach. There has always been suspicion of government control over science. Yet, when it comes to making decisions about potentially dangerous technology, scientists also reject their own "rule by experts" control and favor some public oversight. As such incidents as the 2020 Covid-19 crisis suggest, submitting to the advice of scientific experts may not be the best way to make decisions, because scientists often see only the narrow part of major problems that is related to their area of expertise, when there are other considerations that must be taken into account.

The question about whether government should fund scientific research with predetermined results in mind may indicate a future problem about the independence of research. Older respondents agreed that government should not expect or demand specific results at a 95 percent rate, whereas only 87 percent of those in the 30-39 age category did. This drop—though not precipitous—could suggest a troubling new pattern (unless it is merely a problem of sample size).

There has been a significant change in scientists' beliefs about whether scientific breakthroughs can be methodically manufactured by a team rather than occurring through "serendipity" or individual brilliance. In the 2025 study, only 49 percent favored the individual approach, whereas, in 1988, 74 percent did so. There has been much more emphasis on the team approach in academia in recent decades. Yet, an original idea begins in the mind of one individual, whereas team-oriented science is good at producing incremental advances.

Concerning the ethical environment in science, is the fact that 12 percent of respondents are personally aware of fraud occurring in the last five years good or bad? While not an everyday occurrence, there is still considerable fraud occurring to achieve such a percentage. One disturbing trend is that younger scientists are more personally aware of fraud than their older counterparts. The

rate for scientists in the age 30-39 cohort was a whopping 29 percent, whereas for those in the 60+ cohort the rate was only 8 percent.

The peer review process that has served as the gatekeeper for research quality may be in trouble. Only 6 percent of 2025 respondents said that there is no cause for concern, with a wide range of problems selected.

A key finding about the funding awards process is that the percentage who think the process works well rose precipitously; why this occurred was not revealed, however.

Scientists' assessments of the most important issues facing the scientific community have not changed. They continue to cite lack of public understanding of science, over-politicization of research, and interruptions in funding for research as their major concerns. One issue that was not around in 1988 was whether artificial intelligence would prove beneficial or detrimental to mankind. Today's scientists are divided on the question.

CONCLUSION

Knowledge is power, and in our technological age scientific knowledge is paramount. This means that the attitudes of scientists are an important part of the future—they are by definition an essential part of the scientific process. Some of the results of the 2025 study, particularly when contrasted with those of the 1988 study, reveal an increasingly troubled enterprise. The world of science may be becoming increasingly monolithic politically and less accepting of dissent and original thought. Younger scientists increasingly question whether they can speak freely.

The process of science is also showing cracks in how it is perceived by those most engaged in it. Today's scientists, particularly the younger ones, are more likely to favor group approaches than to rely on the spark of individual genius that has historically made many major breakthroughs. Not only is individual creativity being downgraded, but that trend is combined with a growing belief that consensus—rather than empirical proof—is the deciding factor for what constitutes accepted knowledge. Additionally, anti-science attitudes, such as the belief that anti-meritocratic practices such as "Diversity, Equity, and Inclusion," have become the norm in much of the scientific world, particularly academia.

The United States has been a scientific and technological leader almost from its founding. A major contributing factor for that has been the freedom it has offered to its researchers. The above trends may be showing that the open atmosphere of scientific exploration is waning. It may be that science itself may be heading into a period of questionable practices and increasing doubt that it represents the best-known truths.

Still, it is a vast institution with great momentum from the past, with many earnest individuals still involved; it will not collapse overnight. But the findings of this report represent a warning cry that perhaps the enterprise is veering a bit off-course.

Unfortunately, this study suffered from the small sample size, largely due to a low rate of participation by scientists. It would be interesting to see the results of a much larger study. The question is, does the world of science, which has sought to know everything, really wish to know itself?

NOTES

1. Kaurov, A., Cologna, V., Tyson, C., Oreskes, N.Trends in American scientists' political donations and implications for trust in science. *Humanit Soc Sci Commun* 9, 368 (2022). https://doi.org/10.1057/s41599-022-01382-3

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