Strengthening Scientific Integrity at Federal Agencies

Recommendations for 2021 and Beyond

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Center for
Science and Democracy
at the Union of Concerned Scientists

Government decisions based on science affect us all: the use of science in and by the US government is not only crucial but also often transformative.

In recent decades, government and government-supported scientists have contributed to many of the nation's—and the world's—greatest achievements. They have mapped the human genome, spurred the creation of the World Wide Web, saved imperiled species from extinction, developed lifesaving medicines and medical procedures, and mitigated risks to human health with revolutionary research that has contributed to well-informed public policies (FWS 2019; NIH 2019; NHGRI 2019; NIH 2018; Kahn 1994; DOE n.d.). More recently, science has been essential as the world seeks to prevent, treat, and manage the spread of COVID-19. The collective contribution of government-supported science is incalculable.

However, the safeguards protecting the independence of government science are breaking down. While many presidential administrations have been complicit in that retreat, the activities of the Trump administration have laid bare inherent weaknesses in existing standards, policies, and practices. Since 2017, political officials have stunted or stalled scientific research, rolled back science-based public protections and policies, altered long-standing processes in order to sideline scientific evidence, retaliated against government scientists, weakened and disbanded science advisory committees, failed to fill a large number of critical scientific positions, and undermined career staff (Carter et al. 2019; GAO 2019a; McCrimmon 2019; Carter, Goldman, and Johnson 2018; Mooney 2017). Such actions weaken our nation's health, safety, and environment, with the most severe harm affecting the most vulnerable populations, including communities of color, low-income communities, children, and seniors (Desikan et al. 2019).

As the many, diverse, and well-documented attacks indicate, existing policies and processes are not enough to protect federal scientists and their invaluable work. Even when agencies have strong written policies, implementation and enforcement often fall short. And protections vary widely because federal agencies manage and enforce their own scientific integrity (SI) policies (see table, p. 3).

It is crucial that the US Congress codify SI policies in law *and* require all agencies to implement and enforce those laws. Moreover, while some details may vary from agency to agency, a bedrock set of principles should underpin all such policies. However, until Congress acts decisively to protect scientific integrity through legislation, it is up to all federal agencies to defend and uphold the principles described below.

Principles of Scientific Integrity

Principles of scientific integrity begin with a commitment to independent science. This commitment must encompass processes like peer review and conflict-of-interest disclosure; transparent decisionmaking, including public access to government science and its use in policymaking; and scientific free speech, especially the right of government scientists to share research, express their personal views, and report abuses without fear of retaliation. These tenets must be explicit in policies, promoted by agency leaders, and valued in agency culture.

It is crucial that the US Congress codify scientific integrity policies in law and require all agencies to implement and enforce those laws.

To advance SI policies and practices, federal science agencies should:

- **Establish and empower officials to oversee scientific integrity.** Agencies should appoint officials to oversee scientific integrity, form intra-agency committees, publicly release annual reports on the state of scientific integrity in the agency, and convene an interagency working group on scientific integrity to share resources, best practices, and unify efforts.
- **Educate federal workers on their rights and responsibilities.** Agencies should train federal employees and contractors on scientific integrity, provide detailed

Cover image: Tia Dufour/The White House
Dr. Anthony Fauci speaks about the coronavirus pandemic on July 30, 2020.

Grading Scientific Integrity Policies at Federal Agencies

Agency	SI Policy	Procedure for SI Allegations	Public Reporting of SI Cases	SI Official	Peer Review Policy	Clearance Policy	Media Policy	Social Media Policy	Differing Scientific Opinions	Whistle-blower Protection
Executive Agencies and Sub-agencies										
DOC										
NIST										
NOAA										
Census Bureau										
DOE										
DOI										
FWS										
USGS										
HHS										
CDC										
FDA										
NIH										
DOL										
DOT										
USDA										
Independent Agencies										
EPA										
NASA										
NRC										
NSF										

Strong Some Progress Nonexistent or Poor

This table outlines the steps federal agencies have taken to establish policies and practices intended to safeguard scientific integrity. As the table shows, there is much work to do. To see details on each agency's ratings, please see the appendix at www.ucsusa.org/resources/roadmap-science-decisionmaking.

procedures for addressing differing scientific opinions, and offer opportunities for staff to consult SI officials. This training is especially important for political appointees.

- **Ensure open communication with the press and the public.** Agencies should outline policies, or link and refer to separate policies, that clarify the rights of employees to engage freely with representatives of the news media and to communicate about scientific work on social media platforms when expressing personal views.
- **Enforce clearance and review policies that protect scientific independence.** For official scientific work, agencies should establish clearance policies upholding the right of scientists to publish, ensure that peer review is transparent and free from political interference, and create mechanisms to track and deter inappropriate interference in federal science.
- **Prevent interference in data collection and research funding.** Agencies should ensure that political officials cannot hamper or halt data collection for political or scientifically unjustified reasons. They should also establish mechanisms to prevent the politicization of government funding for research and ensure public access to federal and federally funded science.
- **Minimize conflicts of interest in government science.** Agencies should fill scientific leadership positions with individuals who have relevant expertise and sufficient independence from regulated industries. Agencies should enforce timely disclosure requirements for conflict-of-interest statements and recusals, clarify criteria for appointing advisory committee members, and enact actionable penalties in case of violations.
- **Provide safe and meaningful procedures to report and investigate SI violations.** Agencies should provide clear procedures for addressing alleged violations of scientific integrity and for publicly reporting the resolution of investigations. They should further establish mechanisms to protect scientists from a broad array of retaliatory actions and threats.

Establish and Empower Officials to Oversee Scientific Integrity

If federal agencies are to rigorously implement and enforce scientific integrity, dedicated officials, not political appointees, must manage these critical responsibilities. This would help ensure that political personnel do not sideline science or control implementation of an agency's SI policies. It would also give the public and federal employees a trustworthy avenue for reporting problems.

An example from the Environmental Protection Agency (EPA) illustrates the importance of such avenues. In late 2019, EPA scientists concluded that even low levels of trichloroethylene were unsafe because the chemical can deform fetal hearts. However, when the draft risk evaluation reached the White House for review, political officials made far-reaching changes that downplayed this finding (Shogren 2020). In response, the Union of Concerned Scientists (UCS) filed a formal complaint with the EPA's SI official and requested an investigation, which is ongoing (MacKinney 2020). This serious violation might have gone unaddressed in the absence of such an official.

However, not all agencies have SI officials, and those that do exist generally lack the power to investigate political interference coming from an agency's leadership or outside the agency.

If federal agencies are to rigorously implement and enforce scientific integrity, dedicated officials, not political appointees, must manage these critical responsibilities.

To ensure that SI safeguards are enforceable, agency heads should appoint at least one full-time or full-time-equivalent official to oversee scientific integrity. This individual should have broad power to enforce SI policy, investigate allegations of misconduct, and enforce penalties for violations. This official also should:

- Be a scientist in a career civil servant position, hired, vetted, and appointed by non-political agency officials.
- Report to the agency's highest-ranking civil servant and work with the White House Office of Science and Technology Policy (OSTP) on cross-government issues, such as open-data initiatives, the implementation of SI policies, and strategies to investigate and resolve alleged SI violations.
- Spend a significant portion of work time training employees on scientific integrity and on monitoring and

supporting the agency's efforts to improve on a broad range of SI issues, including but not limited to research integrity and misconduct.

- Have their position, professional credentials, and up-to-date contact information publicly available on the agency website.
- Inform the inspector general of significant interference with scientific integrity.
- Have the power to investigate violations of scientific integrity that occur or are committed by political officials outside the SI official's agency, but that affect the professional work of scientists and experts inside the SI official's agency.[1] When appropriate, extra-agency investigations should be conducted by the SI official in tandem with the inspector general, although the inspector general should not impede or halt a valid investigation by an SI official.
- Be empowered to enforce penalties for confirmed wrongdoing, such as disciplinary action for individuals found to have committed a violation, and to dictate corrective actions following a wrongful decision (Bharara et al. 2019).[2]
- Oversee the publication of an annual report on the state of scientific integrity at the SI official's agency. This report should outline and assess all SI investigations and their resolutions, while protecting personal identities as necessary. It should also identify notable trends and outline proactive steps to discourage future violations (CSLDF 2020).

To ensure the consistent application of SI policies across agencies, and to ensure that agencies share insights, resources, and progress, agencies should facilitate the regular convening of interagency and intra-agency working groups on scientific integrity. These working groups should:

- Be comprised of the SI officers from all agencies in the case of the interagency working group.
- Be comprised of all sub-agency SI officers in the case of intra-agency working groups.
- Collaborate on novel strategies to enforce SI policies and practices, reflect on and discuss recent violations of scientific integrity, and share insights and lessons.
- Be insulated from pressures unduly exerted by political officials. This means that politically appointed figures may not attend or shape the agendas of these meetings.
- Regularly publish records of the group's agendas, discussions, goals, and outcomes.

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In 2019, political officials at the White House suppressed EPA scientist findings about the toxicity of even low levels of the chemical trichloroethylene, which can deform fetal hearts. Here, federal workers engage in a cleanup of industrial contamination in Idaho, including trichloroethylene removal.

Broadly, OSTP must oversee the functioning of SI officers and offices across agencies. OSTP should:

- Establish an assistant administrator of scientific integrity to ensure that agency SI officials have a clear point of contact in OSTP and to coordinate and collaborate with SI officials across agencies.
- Convene and coordinate logistics for interagency and intra-agency working groups and ensure that SI officers fulfill the requirements of their positions.
- Flag violations or weak implementation of SI policies and, if SI officials are not upholding their responsibilities, take appropriate remedial action. However, the role of OSTP is one of accountability and oversight; it should not extend its efforts into the day-to-day activities and responsibilities of SI officials.

Educate Federal Workers on their Rights and Responsibilities

Scientists at federal agencies deserve support for their careers and professional development, protection from political interference, and knowledge about both their rights as federal employees and options for recourse should those rights be violated. Trainings and activities around scientific integrity should include non-scientist federal workers who manage, supervise, and communicate scientific work.

Without these protections, federal scientists can be, and have been, professionally undermined and scientific integrity can be lost. For example, in June 2018, the Department of the Interior outlined a new political review process to determine if US Geological Survey (USGS) scientists could attend

scientific conferences. The new guidelines required scientists planning to attend either of two major annual conferences to provide detailed "attendee justifications" to obtain travel approval by the agency. Political appointees judged the titles of the scientists' planned presentations on whether they adhered to 10 policy priorities of then-Secretary Ryan Zinke. USGS scientists who did not pass this review could not attend the conferences. This represents a serious violation of scientific integrity and hinders scientists' professional development and participation in their broader professional communities (UCS 2018).

To ensure that federal scientists and other employees know their rights and responsibilities, and that they receive support for their crucial work advancing federal science, agencies should:

- Mandate periodic, comprehensive training on scientific integrity for all federal employees—especially, but not limited to, those who use science to a significant degree in their work. The training should include information about protections against censorship and retaliation under federal laws, as well as information about employee rights under agency-specific policies (e.g., an agency's specific peer review processes or specific procedure to report an SI violation).
- Explicitly declare each agency's commitment to fostering an environment of trust among agency scientists. The agency should provide appropriate resources and time for federal scientists to pursue professional development opportunities (e.g., keeping up with scientific advances in their fields through conference attendance, maintaining networks of outside scientific experts, and speaking about science at external events).
- Declare that employees who leave federal service are not required to sign nondisclosure agreements regarding government information that is not classified or proprietary and that does not contain confidential personal information such as personnel records.
- Provide a clear, detailed policy and procedures for addressing differing scientific opinions within the agency. This policy should:
  - Encourage individuals to voice their professional opinions on agency issues, decisions, or policies relevant to their work, even when those opinions differ from the views of other staff, disagree with management, or diverge from proposed or established practices and positions. However, the application of a formal differing-opinions policy should be reserved for an individual who is or has been substantively engaged in the scientific or technical work that informs the specific agency decision, action, or policy with which the employee disagrees.
  - Outline clear, formal steps for individuals to voice differing scientific opinions regarding issues, decisions, or policies on which they are engaged substantively. These steps should be supported by guidance on when such actions are necessary, how the individual should take such actions, and to whom an individual should submit differing scientific opinions.
  - Ensure that any relevant scientific or regulatory decisionmaking process take into consideration differing scientific opinions.
  - Establish a mechanism to protect from retaliation any employee who voices differing scientific opinions.

Ensure Open Communication with the Press and Public

The public has a right to access scientific information produced or funded by the government. Accordingly, government scientists should have the right and obligation to publish their findings and communicate that information to the public. These scientists should be free to express their personal views on science and science-based policies, provided they make clear when they are or are not speaking on behalf of their agency.

Presidential administrations have not always upheld this principle of open communication. For example, on November 8, 2017, the Twitter account for Joshua Tree National Park posted a series of tweets on climate change and its serious impacts on the park's habitats and wildlife. Despite the scientific basis of the tweets, Interior Secretary Zinke ordered the park superintendent to fly to Washington, DC, where Zinke reprimanded him in person (Cama 2017).

To ensure that federal science can reach decisionmakers and the public accurately and promptly, each agency should adopt a public communications policy either within its SI policy or as a separate policy. It should:

- Be easily accessible to members of the public on the agency website.
- Contain significant, explicit language calling for open communications between agency employees and the public, including through social media.
- Clearly distinguish between personal and official public communications—including communications on social media—and provide guidance for official use.

- Clarify that only scientists and subject-matter experts may edit the scientific content of agency communications.
- Ensure that scientists have access to drafts and revisions of press releases, agency documents, and other public-facing communications that report or rely on their work.
- Declare the right of scientists to publicly express their personal views without seeking prior permission, provided it is clear that they are not speaking on behalf of the agency and that they are not using agency time to express these views.
- Declare the right of scientists to publicly identify their employer when expressing personal views, provided it is clear when they are or are not speaking on behalf of the agency.
- Declare the right of scientists to maintain accuracy as the final reviewers of content—including but not limited to the content of press releases, blogs, briefings, and social media postings—that will be released publicly in their names or that significantly relies on their work.
- Declare the right of the original author of scientific or technical content to have errors corrected within a reasonable amount of time. The policy should clearly outline the correction process.
- Ensure that scientists may speak with media without prior approval and may receive and respond to media requests directly, without routing them through a public affairs office.
- Ensure that scientists cannot be required to get preapproval from public affairs personnel or to have such personnel sit in on interviews. Scientists should be encouraged to notify public affairs personnel after interviews have taken place.
- Outline clear procedures for determining who should respond to a media request submitted directly to the public affairs office.
- Ensure a timely response to every interview request and a quick turnaround on issuing press releases or agency communications.

Enforce Clearance and Review Policies that Protect Scientific Independence

Because effective government decisionmaking depends on the best available science, no political official should be able to suppress scientific research, analysis, and reports.

Unfortunately, political interference has become frequent. For example, on May 7, 2020, AP News revealed that White House officials had halted the release of a critical Centers for Disease Control and Prevention (CDC) report. Using the best available science, the report provided step-by-step instructions on how local officials should reopen communities, cities, and states during COVID-19. After the story broke, the White House partially reversed its decision. The CDC published the report on May 19, but even so, the White House required several changes that were not informed by science, such as eliminating guidance for houses of worship (Sun, Dawsey, and Boorstein 2020).

To protect scientists from interference and to promote their engagement with the broader scientific community, each agency should create well-defined, consistent, and transparent clearance procedures for scientific publications, presentations, and conference participation. The procedures should:

- For official work, specify reasonable time limits for reviewing and clearing scientific publications, presentations, and participation in scientific conferences, after which time scientists are free to move forward regardless of whether a review has occurred.
- For non-official work (peer-reviewed publications or conference presentations that do not rely on non-public agency data, for example), assume written clearance from supervisors and other reviewing officials (i.e., a scientist may move forward with their non-official work) on the condition that scientists make specified changes no later than 30 days after submission.
- Provide the right, if that 30-day deadline is not met, to submit the article for publication or make the presentation with an appropriate disclaimer stating that the contents do not represent agency views or policies.

White House officials had halted the release of a critical Centers for Disease Control and Prevention report on reopening communities during COVID-19.

- Declare the right of scientists to review official agency content that will be released publicly in their names or that significantly relies on their work.
- Declare that no agency internal review is required for scientific work done on employees' personal time and that does not use nonpublic government data or government resources.

To ensure rigorous peer review processes that are protected from political interference, each agency should have in place a peer review policy that:

- Details the agency's commitment to, and processes to ensure, transparent and independent peer review beyond the Office of Management and Budget's (OMB) 2004 "Final Information Quality Bulletin for Peer Review." That bulletin established baseline standards for all agencies.
- Clarifies that, when feasible and appropriate, an agency's official scientific research should undergo independent peer review, with at least one reviewer external to the agency and all peer reviewers technically qualified and selected based on expertise.
- Requires peer reviewers to disclose existing positions or stances relevant to the topic under review, as well as any personal or institutional funding they have received.
- Requires the publication and regular updating of a peer review agenda of highly influential scientific assessments, as dictated by the OMB's 2004 bulletin, or requires the agency to explain why it is exempt.[3]
- Stringently protects against substantive changes to the science from political officials, including executive-branch officials outside the agency in question.
- When feasible, makes drafts of highly influential scientific assessments available for public comment at the same time they are submitted for peer review.

To enhance accountability for interactions between political officials and career scientists, and to prevent political interference in scientific work, each agency should:

- Publish a policy outlining measures to ensure that political officials do not inappropriately influence the work of scientists and other experts at agencies.
- Identify individuals who are permitted to communicate with scientists and experts during the technical and scientific stages of regulatory development (Bharara et al. 2019).
- Formally log all phone calls and meetings (both in-person or virtual contacts) between political officials (both at the agency and White House) and agency scientists and experts. The log should include, at a minimum, brief descriptions of the issues discussed and the names of all participants; the inclusion of more detail regarding these interactions should be explicitly encouraged (Bharara et al. 2019).
- Require agencies to publish reports based on these contact logs, enabling Congress, inspectors general, the courts, and SI officials to keep political officials accountable.

To ensure that science-based rulemaking is transparent and protected from inappropriate political interference, whether from inside or outside an agency, each agency should:

- Make redlined versions of agency rules, documenting OMB edits and changes during the rulemaking process, accessible to the public at the time rules are published on regulations.gov, as required by Executive Order 12866, Section 6(a)(3)(E)(iii).[4]
- Publish a clear, simple explanation of and justification for every major change proposed by OMB. This information should be easily retrievable (e.g., in memos distinct and separate from redlined documents) (Wagner 2013).
- Preemptively publish records of all research, sources, and correspondences—including meetings and telephone calls—used by the agency to inform the rule-drafting phase for any science-based regulatory proposals.
- Make these records publicly available within a reasonable timeframe after the research, correspondences, or source retrieval occurred.
- Avoid applying deliberative process protections in the rule-drafting stages. Deliberative process protections allow agencies to withhold information from the public; sometimes these exemptions are necessary (for example, to protect confidential information), but they have also been applied indiscriminately to information, like research and communications informing regulatory decisionmaking, that is crucial to ensuring accountability (Wagner 2013).

Prevent Interference in Data Collection and Research Funding

Data collection and research are central to government science and, by extension, government decisionmaking and the public's well-being. Scientific research can reveal problems, identify solutions, and ensure that solutions are effective. This is a cornerstone of informed governance.

When federal agencies cannot collect data and conduct research, it stunts the government's capacity to protect the

public. For example, the Occupational Safety and Health Act of 1970 specifically charges the Occupational Safety and Health Administration (OSHA) with collecting data on work-related injuries and illnesses, including respiratory illnesses like COVID-19. However, on April 10, 2020, OSHA partially rolled back this reporting requirement. As a result, many companies—with the exception of health care industries, emergency response organizations, and correctional institutions—no longer had to report. As a result, OSHA generally no longer requires companies to report COVID-19 cases among their workers, preventing the government and the public from using up-to-date data to inform health and safety decisions.

To ensure that political officials cannot hamper data collection or impede access to federally funded data, agency policies should:

- Affirm the agency's commitment to and support of scientifically important data collection, independent of financial interests.
- Ensure that agency scientists who request data for official work receive these data in a timely manner, as long as the requests do not violate existing regulations (e.g., the Paperwork Reduction Act of 1980).[5]
- Require that the agency gives notice before removing datasets from public websites, and that the agency makes the best effort to ensure the data continue to be publicly available.
- Mandate trainings for federal scientists and other experts on the scientific and technical resources available to them, including data repositories, and provide guidance on how to access and effectively use these resources.[6]
- Ensure that the public has access to unclassified, federally funded data in a timely manner and with appropriate context to enhance public understanding.
- Create enforcement mechanisms, including meaningful penalties for noncompliance, to ensure that agency personnel comply with the requirement that unclassified, federally funded data be publicly available.

To prevent the politicization of research funding, agencies should:

- Commit to rigorous, independent reviews by in-field experts of scientific proposals for federal grants and funding.
- Declare that political appointees may express opinions on grant solicitations, but only qualified career staff may review and decide on the scientific merit of grant proposals.
- Clearly document reviews of grant proposals.
- Declare that the receipt of a scientific research grant from any federal agency does not constitute a conflict of interest and should not preclude a grant recipient from participating on federal advisory boards, committees, and panels.
- Establish mechanisms to ensure that, once grant funding has been awarded and distributed, political officials cannot rescind, reallocate, or limit use of that funding, nor can political officials at any agency move to delay use of funding for political reasons.[7]

Prevent Conflicts of Interest in Government Science

The use of science to inform agency decisionmaking must be as unbiased as possible, and the science itself should be independent—in other words, free of political, ideological, or financial influence. Independent science helps our government make informed decisions to protect public health and safety, and it enhances public trust when decisions are based on valid, credible processes.

However, conflicts of interest have endangered independent science and its use in decisionmaking. These conflicts can undermine public trust, weaken civic participation, erode the credibility of individuals or entire fields of expertise, and ultimately harm people and the environment (RDWG 2005; Bélisle-Pipon et al. 2018).

Conflicts of interest plague the Trump administration, and many agencies fail to ensure that employees and external advisors meet federal ethics requirements. For example, the number of university scientists on the EPA Science Advisory Board dropped by 45 percent between 2017 and mid-2020 (EPA 2020). In this same period, the number of members with industry affiliations tripled, not including individuals from consulting firms or state governments who have long histories of working closely with the private sector (Reed 2019). The Government Accountability Office found that the EPA's process for appointing individuals to the board and to its Clean Air Scientific Advisory Committee during this time was flawed because it "did not consistently ensure that members . . . met federal ethics requirements" (GAO 2019b).

To ensure that agency decisions rely on independent science, free from conflicts of interest, agencies should:

- Explicitly define conflicts of interest and establish guidelines about which conflicts would disqualify individuals from participating in committees, panels, and other activities.
- Require that scientific leadership positions be filled by individuals with specialized training or experience relevant to the positions for which they are nominated.[8]

- Publicly disclose conflicts of interests and recusal statements of all political officials in a timely manner, with clear, specific timelines and deadlines for these disclosures.
- Require agency decisionmakers to recuse themselves from scientific discussions and issues for which they have a direct conflict of interest or that involve any of the decisionmakers' employers or clients from the previous two years.
- Enforce these recusals by agency inspectors general, with actionable penalties in case of violations.
- Bar from decisionmaking authority any employees with ties to financial interests that would directly benefit from policies on which they work.
- Stipulate in conflict-of-interest waivers the parameters of permitted participation and make these waivers public before major decisionmaking.
- Bar political appointees from lobbying their agencies for a minimum of five years after they leave government service.

To ensure that peer review processes are independent and free from conflicts of interest, agencies should:

- Require that all personnel involved in a peer review—including reviewers, agency contractors, and administrative staff—disclose financial ties to institutions potentially affected by the review.
- Require that peer reviewers' comments on documents that rely on science and agencies' responses to those comments be publicly available, while protecting the anonymity of reviewers.

To protect scientific advisory committees from conflicts of interest, agencies should:

- Ensure that members of committees solely dedicated to providing objective scientific advice are appointed as special government employees and vetted for financial conflicts of interest.[9]
- Ensure that scientists who have taken public positions on issues, are members of scientific associations, or have received government funding for scientific work are not excluded from advisory committees because of concerns about bias.

Provide Safe Procedures to Report and Investigate Violations

Even with comprehensive SI policies in place, violations and abuses can occur. Agencies must provide their employees, and scientists outside the agency, with clear procedures for reporting violations without fear of retaliation. Agencies must respond quickly and effectively to allegations and enforce penalties for individuals found to have committed SI violations. Such policies would help empower employees to report problems safely and, as a result, ensure that violators are held accountable.

An example of the importance of this principle took place in September 2018, when President Trump suggested that Hurricane Dorian could hit Alabama. He reiterated this baseless claim days later, showcasing a map that had been altered with a marker to include the state in the hurricane's projected path. National Weather Service (NWS) meteorologists in Alabama, reacting to a flood of calls from concerned state residents, tweeted that Dorian would not reach the state (Goldman 2019). Secretary of Commerce Wilbur Ross threatened to fire staff at the National Oceanic and Atmospheric Administration (NOAA), which oversees the NWS, if the agency did not disavow the Alabama meteorologists (Flavell, Friedman, and Baker 2019). In June, an independent SI panel—responding to complaints from NOAA employees—investigated the incident and found that two NOAA leaders had violated the agency's SI policy (although no penalties have been applied) (Freeman and Samenow 2020). In this case, career leaders at NOAA had the power to speak up because NOAA has a strong SI infrastructure and a clear reporting process.

To ensure that scientists and other federal employees feel safe about reporting violations of scientific integrity, and to ensure that agencies investigate allegations meaningfully, agency policies should:

- Outline clear, detailed guidelines on how and when to submit allegations, ensuring that the guidelines define, describe, and apply to a broad array of potential SI violations.
- Provide clear, detailed policies and procedures for investigating allegations of SI violations and for publicly reporting their resolution.
- Recommend standards for corrective actions and punitive measures for employees whose actions have led to losses of scientific integrity.
- Clearly outline and detail specific timelines and milestones for investigative processes such that they move quickly and are not slowed by politically motivated delays.
- Establish a mechanism to distinguish between a legitimate interaction (e.g., normal managerial oversight of scientists or routine disagreement in opinion) and deliberate, well-evidenced political interference that seriously deviates from the scientific community's standard practices (Bharara et al. 2019).

- Require the agency to track and release (annually, biannually, or more frequently) agency-specific cases of SI violations.
- Distinguish public reports of SI violations from case tracking conducted by the agency's office of the inspector general, which oversees investigations into a much broader array of allegations, including inefficiency, wastefulness, and fraud.
- Require that these records contain the details of confirmed SI violations, including summaries of closed cases and descriptions of the allegations.

To protect federal scientists and other employees from violations of SI policies, retaliation from political officials, and threats of retaliation from political officials, agencies should:

- Have agency heads direct inspectors general to coordinate with the SI office to resolve SI complaints, particularly when allegations involve political personnel.
- Explicitly and formally define key principles and terms, such as "retaliation" and "scientific integrity violation," ensuring that they include a wide array of forms. This information may not be intuitive to scientists, experts, and other employees; the agency must be proactive and assertive.
- Declare the agency's commitment to supporting scientific integrity and protecting whistleblowers, encouraging employees to report losses of scientific integrity, and providing information about anti-censorship and anti-retaliation rights under federal law.
- Certify the agency and its office of inspector general under the Office of Special Counsel 2302(c) Certification Program to ensure baseline compliance with the Whistleblower Protection Enhancement Act.

Conclusion

To restore and preserve the values of scientific integrity, federal agencies must commit—or recommit—to the foundational principles that protect science and its role in government. Agencies must establish and empower SI officials, educate scientists on their rights and responsibilities, ensure open communication with the press and public, enforce approval policies that protect scientific independence, prevent interference in data collection and research funding, and provide safe procedures to report and investigate violations.

In so doing, agencies will reinforce their role in and commitment to promoting an honest, open, and effective democracy. They will demonstrate the importance of evidence, research, and truth in good governance. Science must be used to inform and protect the public good, and it is up to our leaders to make this a reality.

Taryn MacKinney *is an investigative researcher in the Center of Science and Democracy at UCS.* ***Jacob Carter*** *is a scientist in the Center.* ***Genna Reed*** *is a lead science and policy analyst in the Center.* ***Gretchen Goldman*** *is the research director of the Center.*

ENDNOTES

1 For example, if a White House official interferes with an EPA scientific report or risk assessment, the EPA's SI officer should have the power to investigate and remediate as needed in a timely manner.
2 For example, if a report were inappropriately withheld from the public, the SI officer should dictate the report's release.
3 This is already required by the OMB's 2004 bulletin, but some agencies do not make this information clear.
4 Executive Order 12866, October 4, 1993: Regulatory Planning and Review, 58 FR 51735. https://www.archives.gov/federal-register/executive-orders/1993-clinton.html#12866
5 This data retrieval could be managed by apolitical agency library personnel or information technology employees.
6 Government librarians and other career officials could conduct these trainings.
7 These mechanisms should discern between political and legitimate, nonpolitical reasons to rescind or reallocate research funds. For example, a recipient's research misconduct may justify a rescission. These mechanisms should also apply to political officials external to a given agency but still able to impede the use of research funds, such as the Office of Information and Regulatory Affairs.
8 These would be analogous to the requirements in place for the Department of Agriculture's chief scientist.
9 This would not apply to committees designed to gather input from diverse stakeholders.

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Strengthening Scientific Integrity at Federal Agencies

Recommendations for 2021 and Beyond

> ***Independent science is under attack in government decisionmaking and its integrity must be restored.***

Government decisions affect our public health and safety and must be rooted in strong, independent science. But the safeguards protecting government science have broken down significantly, with the Trump administration in particular laying bare the inherent weaknesses in existing scientific integrity standards, policies, and practices.

Since 2017, political officials have stunted or stalled scientific research, rolled back science-based public protections and policies, retaliated against government scientists, weakened and disbanded science advisory committees, failed to fill a large number of critical scientific positions, and undermined career staff. Such actions weaken our nation's health, safety, and environment, with the most severe harm affecting the most vulnerable populations, including communities of color, low-income communities, children, and seniors.

Existing policies are not enough to protect government scientists and their invaluable work. Our nation finds itself in the midst of a global pandemic, bracing for the most severe impacts of climate change, and enduring a public health crisis of racism hampering scientific progress and innovation, among other science and technology issues. It is crucial that the US Congress codify scientific integrity policies and enforce them by law to restore independent science to its rightful place at the heart of government decisionmaking.

Union of Concerned Scientists

FIND THIS DOCUMENT AND APPENDIX ONLINE:
www.ucsusa.org/resources/roadmap-science-decisionmaking

The Union of Concerned Scientists puts rigorous, independent science to work to solve our planet's most pressing problems. Joining with people across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.

NATIONAL HEADQUARTERS
Two Brattle Square
Cambridge, MA 02138-3780
Phone: (617) 547-5552
Fax: (617) 864-9405

WASHINGTON, DC, OFFICE
1825 K St. NW, Suite 800
Washington, DC 20006-1232
Phone: (202) 223-6133
Fax: (202) 223-6162

WEST COAST OFFICE
500 12th St., Suite 340
Oakland, CA 94607-4087
Phone: (510) 843-1872
Fax: (510) 451-3785

MIDWEST OFFICE
One N. LaSalle St., Suite 1904
Chicago, IL 60602-4064
Phone: (312) 578-1750
Fax: (312) 578-1751

WEB: www.ucsusa.org

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