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**Mr. Brian Stone**

Acting Director, National Science Foundation

2415 Eisenhower Avenue

Alexandria, VA 22314

**RE: Response to NSF Dear Colleague Letter – Intent to Restructure Critical Weather Science Infrastructure**

Dear Acting Director Stone and the NSF NCAR restructuring team:

I am writing to provide a formal response to the Request for Information (RFI) regarding the proposed restructuring of the NSF National Center for Atmospheric Research (NCAR) and its critical weather science infrastructure contained within the January 23, 2026 Dear Colleague Letter (DCL) entitled “NSF Intent to Restructure Critical Weather Infrastructure.” I submit these comments in my professional capacity as an atmospheric research scientist within the University of California, where my research focuses on the physics and dynamics of atmospheric processes related to extreme weather events and their role in shifting natural hazard and disaster risk.

My perspective is informed by a public-sector career dedicated to bridging the gap between fundamental atmospheric research and real-world application in an academic context, with a particular focus on understanding and mitigating the risks associated with catastrophic events related to droughts, floods, and wildfires. But it is also informed by my extensive collaboration with the private sector, where I presently serve as a scientific and strategic advisor to multiple U.S.-based and international companies in the insurance, reinsurance, technology, and environmental data sectors. Together, these experiences have provided me with a unique vantage point regarding the deep and longstanding reliance of the American public and private sectors alike upon the foundational open-access science generated by NCAR—and also how sustained federal investment in human capital and physical infrastructure related to atmospheric and natural hazard science directly translates into actionable intelligence that protects human life and property.

**Accordingly, I am gravely concerned regarding the current proposal to substantially dismantle NCAR, shutter key facilities, and greatly narrow its research focus.** Actions that have been proposed, or in some cases already appear to be underway, will (if not halted) harm not only the scientific research community and tarnish the historical legacy of American leadership in atmospheric and Earth science, but also directly threaten the safety of the American public as well as its economic resilience. In the paragraphs below, I respond directly to specific topics raised in the NSF DCL—emphasizing the foreseeable harms that would arise if proposed changes occur and offering

constructive suggestions regarding how the already remarkable institutional efficiency and societal impact of NCAR could be further enhanced through *increased* (not decreased) federal support in the years to come.

Please note: To ensure the highest level of technical rigor, this response focuses exclusively on the core atmospheric and natural hazard science topics within the author's primary domain of expertise; for this reason, I have omitted a response to Topic 4 (Space Weather)."

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### **NCAR weather modeling and atmospheric observing capabilities**

*a) Management and operations of weather-related observational platforms, modeling and science as a stand-alone activity.*

The proposed management of weather-related research as a stand-alone activity is a scientifically regressive path that ignores the fundamental physical reality of the Earth system. Modern atmospheric science has demonstrated (largely, it is worth noting, due to groundbreaking research originating at NCAR) that weather and climate exist along a single, continuous physical spectrum. There is no clean physical separation between these scales; they represent the same atmosphere operating across different temporal and spatial dimensions. Mandating a focus only on a narrow subset of shorter, weather-scale timescales would be akin to mandating scientific malpractice by excluding the relevant physical processes that unfold over longer timescales but directly govern the evolution of individual weather events.

Artificially segmenting the atmospheric science enterprise in this way ignores the critical physical drivers of extreme events that lead to high-impact weather events that threaten lives and property. Whether considering flash flood-producing downpours, tornado-generating severe thunderstorms, wildfire-driving windstorms, or hurricane-derived storm surges, the underlying fluid dynamics and thermodynamics remain the same. High-fidelity weather prediction still necessitates an understanding of slower-moving components, such as ocean-atmosphere coupling and land-surface feedbacks. The laws of physics, and of chemistry, apply equally across time and space; after decades of convergent science, why should NCAR be forced to ignore its own transformative discoveries at the weather-climate interface?

**Ultimately, NCAR cannot function as a "weather-only" research institution; such a model makes neither scientific nor practical sense.** If the NSF were to mandate such a change, NCAR would no longer be able to fulfill its foundational mission to "understand the behavior of the atmosphere and related Earth systems." Dismantling the synergy between these scales would make NCAR significantly less efficient and less capable of conducting world-class science relative to its unconstrained global peers.

*b) Management and operations of weather-related observational platforms, modeling and science as combined with other NSF investments/facilities.*

**The highly specialized nature of the NCAR-Wyoming Supercomputing Center (NWSC) infrastructure represents an extraordinary value proposition that cannot be replicated by combining it with more generalized NSF programs.** The NWSC is not a generic high-performance computing (HPC) facility; it is a laboratory uniquely optimized for atmospheric science workflows, with a hardware and storage architecture specifically designed to handle the massive, high-bandwidth data demands of Earth system modeling. Furthermore, its model of providing an excellent, free-at-point-of-use technical support team ensures that the focus remains on the science rather than the overhead of systems administration. This centralized expertise allows individual researchers, smaller labs, and even entire universities—who would otherwise be locked out of "big science"—to conduct research on a scale that would be impossible with localized resources. There is no realistic prospect that spinning up a decentralized or combined facility could ever replicate this level of extreme efficiency and tailored expertise on a cost-effective scale.

My own career experience as a scientist within the University of California underscores the necessity of this integrated management model. For over a decade, I have used the NWSC as the primary engine for most of my data analyses and scientific visualizations. Even within major university systems, relying on NCAR's centralized resources has proven far more efficient—economically, temporally, and technically—than attempting to maintain a comparably powerful localized computing cluster at each individual campus. Moreover, the synergy between the specialized hardware at the NWSC and the integrated development of modeling platforms like the Model for Prediction Across Scales (MPAS) is a testament to why these investments must remain unified. MPAS, which as of early 2026 has been officially adopted by the National Oceanic and Atmospheric Administration (NOAA) as its flagship dynamical core for next-generation prediction, was born from this specific environment where software engineering and fundamental research are part of a singular, efficient workflow.

**Finally, there is considerable concern in both the public and private sector at present that even temporary interruptions in data availability or model support, which is a foreseeable outcome of the current proposal, could have exceptionally disruptive consequences.** For instance, I am personally using high-resolution "snapshot" data from multiple versions of the NCAR-developed Community Earth System Model (i.e., simulated weather data from a broader ensemble of climate model experiments) for multiple ongoing studies, and these datasets are similarly critical to the daily workflows of the private sector companies I advise in the insurance and technology sectors. These archives represent decades of community investment and are at immediate risk of permanent loss or deletion if NCAR's unified management is dismantled. Any degradation of these observational and modeling support systems would not merely impede future progress—it would actively degrade our present capacity to simulate, predict, and respond to extreme weather events and associated natural hazards/disasters.

**NCAR Mesa Lab (located in Boulder, Colorado)**

*a/b) Ownership of the NSF NCAR Mesa Lab building for public and private use.*

Far more than just an office building, NSF NCAR Mesa Lab is an iconic and purpose-built facility designed specifically for the study of atmospheric science. Its position at the physical interface of the Rocky Mountain foothills and the Great Plains is a deliberate reflection of its mission, serving as a visible symbol—in an iconically American setting—of the federal government's enduring commitment to science in service of society. For many in the field, including myself, the Mesa Lab holds singular importance as a focal gathering point for the global atmospheric science community. My own early career exposure to weather and Earth system modeling, in fact, occurred within these walls, and I have long felt that the facility's architecture and location inspire a necessary sense of awe regarding the atmosphere's complexity and dynamism.

The facility also plays a critical role in hosting community events, educational programs, and international workshops that directly support NCAR's mission to "support, enhance, and extend the capabilities of the university community and the broader scientific community, nationally and internationally."

Beyond its utility to researchers, the Mesa Lab is a frequent destination for local and national members of the broader public who are fascinated by weather and climate. For many visitors, the facility is viewed with the same reverence one might afford a national monument or—given its location within a region of exceptional natural beauty—even a national park. It is a site of scientific pilgrimage that remains open to all, fostering a unique transparency that allows everyday citizens to walk the halls of an internationally renowned research institution. This accessibility provides cascading benefits in terms of public support for federally-funded science. **By maintaining the Mesa Lab as a unified, public scientific asset, the NSF ensures that the "gold-standard" of atmospheric research remains visible and tangible to the society it serves.** To transition this facility to private use or to fragment its ownership would be to strip the nation of world-leading expertise; it would be a retreat from the very transparency and public engagement that underpin the long-term success of the American scientific enterprise.

**Are there any areas in which NCAR activities or capabilities duplicate those of other government agencies, universities, or the private sector?**

**NCAR's efforts are rarely duplicative of other federal, academic, or private sector efforts; rather, they are strikingly synergistic and multiplicative in both their scientific impact and their economic return on investment (ROI).** Individual universities simply lack the resources and specialized institutional mandate required to maintain massive, open-access community datasets or the high-performance computing (HPC) environments—such as the NCAR-Wyoming Supercomputing Center (NWSC)—that NCAR provides to the entire nation. NCAR acts as a force multiplier, providing the foundational infrastructure that allows thousands of university-based researchers to perform "big science" that would otherwise be impractical. Additionally, through partnerships with numerous government agencies and entities beyond NSF, from local to federal levels, NCAR is positioned to act

as a low-cost “internal partner” capable of offering highly specialized weather, climate, and natural hazard-related expertise and to rapidly spin up collaborations that accelerate the science-to-action pipeline.

Similarly, the private sector—including the specific entities I advise in the global insurance, reinsurance, and technology sectors—depend on NCAR as a “global pillar” of the field. These companies do not duplicate NCAR’s work; they build upon it. They rely on NCAR to provide the type of foundational data and model code that requires too long a developmental horizon for any single company to produce independently, or profitably. In my experience, the private sector views NCAR’s output as a public good that underpins a multi-billion dollar industry; for the federal government to dismantle this foundation under the guise of reducing “duplication” would be a catastrophic misunderstanding of the ecosystem’s reliance on centralized, world-class research. I can confirm, in fact, that multiple business leaders with whom I have spoken with regarding the proposed plan to dismantle or narrow the mission of NCAR have responded with a mix of confusion and dismay; I seek to represent their perspectives in this letter as well as my own.

Ultimately, NCAR provides a unique and irreplaceable service that bridges the gap between fundamental research and societal application. It is the only institution with the specific mission and scale to coordinate the integration of atmospheric observations, high-performance computing, and community modeling into a unified whole. **This centralized efficiency is what allows the U.S. to remain a global leader in atmospheric science. Fragmentation of these activities would not eliminate duplication—it would eliminate the very synergy that makes the American weather and climate enterprise so effective.**

**Are there other concepts for management and operations of NCAR activities that differ from the current model that NSF should consider?**

**The most critical alternative concept for the management and operations of NCAR is not a reduction in scope or a fragmentation of facilities, but rather a strategic and sustained *increase* in federal support for its weather, climate, and natural hazard-focused research and applied science.** NCAR’s current operating budget, as it presently stands, is strikingly lean for an organization of its global stature and immense scientific importance. Given the rising economic and societal costs associated with extreme weather and associated hazards, the foundational research and model development/refinement pipeline provided by NCAR have become essential national infrastructure. Accordingly, funding for NCAR should be scaled to meet the growing technical requirements of both public and private sector stakeholders, ensuring that the U.S. maintains its competitive lead as other nations significantly expand their investments in atmospheric research.

One promising avenue that the NSF should explore with respect to NCAR is a management framework that can better accommodate both public-private and intra-government partnerships to capitalize on the growing size and scope of the weather and climate communities. There is immense untapped potential in streamlining the workflows, policies, and procedures surrounding novel, innovative, and strategic partnerships with state governments and federal agencies like NOAA/NWS—as evidenced by the high-impact operationalization of NCAR-developed tools like

MPAS—and with any number of companies and nonprofit entities which would be eager collaborators. **While private sector investment in specialized analytics is growing rapidly, it must be explicitly understood that private dollars cannot and will not replace foundational federal funding; the private sector simply does not have the mandate or the multi-decade developmental horizon required to produce the "gold-standard" science upon which it relies.** However, if these partnership pathways are modernized and made more flexible, private investment could strategically augment federal dollars, creating a multiplicative effect that accelerates the science-to-action pipeline while ensuring NCAR remains a stable, public-good anchor for atmospheric research.

**What should the performance objectives and metrics be for a restructured atmospheric research center?**

The primary metric for success must be the center's efficacy in protecting human life and property through the robust and rapid translation of fundamental science into actionable intelligence. Any future restructuring must prioritize the research-to-operations pipeline as a core performance objective. This includes 1) the continued growth and maintenance of community-developed software and open-access data archives, which serve as a foundation for weather, climate, and natural hazard research globally; and also 2) a continued ability to provide consistent, high-level technical support for the community datasets and modeling frameworks that underpin global research. **Success should therefore not be measured by administrative narrowness or "efficiency" in a purely fiscal sense, but by NCAR's overall ability to provide the integrated science necessary for national resilience to weather and climate events.**

Performance metrics should also explicitly account for NCAR's indispensable role in the training and mentorship of the next generation of Earth system scientists, including its role in offering unique services and opportunities to University Corporation for Atmospheric Research (UCAR) member institutions (i.e., the consortium of over 100 American universities that manages NCAR) on an ongoing and sustained basis. Such metrics should also be able to capture NCAR's status as a focal point for international, interdisciplinary, and interagency collaboration; any metric of institutional health must reflect NCAR's role as a "beating heart" of the field.

Ultimately, the performance of NCAR must be evaluated by the health and integrity of "the whole"—a balanced portfolio that encompasses fundamental research, a robust research-to-operations pipeline, essential community support, the education of the future workforce, and various collaborative endeavors. Success should be defined by the institution's ability to maintain national and international preeminence while continuing to serve as the integrated engine of innovation for the weather and climate community.

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I am compelled to reiterate that NCAR truly is a singular institution of global prominence, and it is to NSF's great credit that it has historically supported NCAR's vital activities via the Federally Funded Research and Development Center (FFRDC) process. **To dismantle NCAR or narrow its focus, however, would be a terrible and quite frankly inexplicable mistake—and would represent a severe blow to American science, writ large.** For six decades, it has played a greater cumulative role in advancing weather and climate modeling than perhaps any other entity in the world, and it does so on a budget that is strikingly modest relative to its outsized impact. NCAR is decidedly more than the sum of its parts: it is an integrated engine of innovation where weather, climate, and natural hazard research exist in a necessary and vital synergy. Even a partial dismantling would almost certainly diminish the efficacy and societal benefits this institution provides at a time when the nation's economic resilience and public safety have never been more dependent on its success.

**It is my sincere hope that NSF ultimately decides to maintain, and even redouble, its longstanding commitment to supporting the “gold-standard” atmospheric science that NCAR continues to conduct** in successful fulfillment of its mission statement to “understand the behavior of the atmosphere and related Earth systems...[and] to foster the transfer of knowledge and technology for the betterment of life on Earth.”

Thank you for your consideration.

Sincerely,



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