DECLARATION OF JUSTIN SCHWARTZ

I, Dr. Justin Schwartz, declare under the penalty of perjury pursuant to 28 U.S.C. § 1746 that the foregoing is true and correct:

1. I am Chancellor at the University of Colorado Boulder ("CU Boulder or "the University"). I am over the age of 18 and have personal knowledge of all the facts stated herein, including knowledge based on my experience and information provided to me. If called as a witness, I could and would testify competently to the matters set forth below.

2. I submit this Declaration in support of the Plaintiff States' Motion for Preliminary Injunction to explain the consequence of the National Science Foundation (NSF)'s grant terminations to the University of Colorado Boulder and the impact of NSF's stated plan to impose a flat 15% cap on indirect cost rates.

3. I have held the position of Chancellor of the University of Colorado Boulder since July 1st, 2024. Prior to holding this position, I was Executive Vice President and Provost at The Pennsylvania State University (interim then permanent) from 2022-2024, after serving as the Harold and Inge Marcus Dean of Penn State's College of Engineering from 2017 to 2022. I have spent my career as a researcher, educator, entrepreneur and academic leader in large state universities. I hold a bachelor's degree in nuclear engineering from the University of Illinois Urbana-Champaign and a doctorate in nuclear engineering from the Massachusetts Institute of Technology. I am a fellow of the National Academy of Inventors, the American Association for the Advancement of Science, the Institute of Electrical and Electronics Engineers, and ASM International.

4. CU Boulder's indirect cost rate is negotiated with the Department of Health and Human Services and is approved at 56.5%. This rate is calculated by allocating costs that support research at CU Boulder such as utilities, library facilities, lab equipment, safety and compliance services and grant management. As the Chancellor, I have personal knowledge of the contents of this declaration or have knowledge of the matters based on my review of information and records gathered by CU Boulder personnel and could testify thereto.

5. CU Boulder is Colorado's flagship university and a member of the Association of American Universities (AAU). It is known for its strengths in engineering, earth and life sciences, and space research. CU Boulder enrolls more than 39,000 students, including nearly 7,000 graduate students, and awards approximately 1,300 doctoral degrees annually across a broad range of disciplines. NSF-funded research is performed across CU Boulder's campus. NSF helps to fund the purchase and maintenance of research equipment (including service contracts), the construction and maintenance of state-of-the-art facilities, laboratories and other facilities such as cleanroom environments that use advanced filtration systems and associated micro- and nano-fabrication capabilities that support manufacturing research in semiconductors and quantum technologies as in the case of the new NSF-funded National Quantum Nanofabrication (NQN) facility. As with other equipment and facilities, this facility, would be available to users to researchers from across the United States. NSF-funded research at CU Boulder includes:

a. Research in quantum science and engineering at CU Boulder requires advanced equipment designed to manipulate and measure phenomena at the smallest scales. This includes high-stability laser systems for quantum optics and vibration-isolated optical tables for precision measurement. Nanofabrication tools such as electron beam lithography and thin-film deposition systems are essential for

developing quantum devices, and high-performance computing clusters are used for quantum simulations and data analysis. These tools are essential for research in quantum sensing, communication, and computation.

a. CU Boulder's AI research relies on cutting-edge computational infrastructure and operation of specialized laboratory facilities. This includes GPU-enabled high-performance computing clusters for training large-scale machine learning models, as well as secure data storage and advanced networking systems to support distributed AI research. In human-centered AI work, such as that conducted by the NSF-funded iSAT Institute, researchers use interactive lab environments equipped with speech and gesture recognition tools, and neural activity, enabling researchers to study real-time human-AI interaction in complex, collaborative environments. The facilities are essential to iSAT's mission to design AI systems that are transparent, adaptive, and aligned with human communication patterns—particularly in applications such as national security, workforce automation, and next-generation classrooms. The ongoing operation and maintenance of these facilities rely heavily on the university's ability to recover indirect costs.

b. NSF funds engineering research at CU Boulder that is supported by specialized laboratories, such as the CU Facility for Electron Microscopy of Materials (FEMM) and the Colorado Shared Instrumentation in Nanofabrication and Characterization (COSINC), and testbeds for wireless communications, power systems, sensing technologies, and biomedical devices. Key equipment includes RF spectrum analyzers and signal generators for communications research, grid simulators for power systems, and MEMS fabrication tools for building micro- and

nanoscale sensors. Optical systems, mechanical testing platforms, and cleanroom facilities enable work in photonics, smart materials, and medical diagnostics. These resources are critical to advancing technologies used in national defense, aerospace, and infrastructure resilience.

c. Research in atmospheric and planetary sciences at LASP relies on equipment that enables both laboratory-based and observational studies. These include space environment simulation chambers, spectrometers, plasma diagnostics tools, and detectors for analyzing solar and magnetospheric phenomena. Ground-based instruments such as LIDAR and radio telescopes support remote sensing, while supercomputers enable large-scale modeling of space weather and climate systems. These tools are critical to the understanding of Earth's upper atmosphere and its interactions with solar and space conditions that affect satellites, communications, and global climate.

6. CU Boulder's NSF-funded research portfolio is extensive, reaching nearly every part of campus. NSF supports critical and cross-cutting research in areas such as quantum technologies, artificial intelligence, materials science, and engineering, enhancing U.S. scientific competitiveness, workforce development, and national security.

7. The University of Colorado Boulder annually receives approximately $495.4M from the federal government to support that research work, reflecting 67% of CU Boulder's annual research awards (FY24). In FY 2023, $ 115.2M in federally sponsored research funded by NSF.

8. CU Boulder intends to apply to NSF for new funding awards, and renewals and continuations of existing funding awards, in the next year and in future years to come.

9. Disruptions to CU Boulder's research will also have negative effects in the Boulder area, the state of Colorado, and the broader region. More than 13,500 Colorado residents are directly employed by CU Boulder—and it collaborates with state and local partners to help solve regional challenges through joint research and innovation. The University of Colorado Boulder's research also fuels spending in the regional economy, including by driving discoveries that launch new ventures, attract private investment, and make a positive social impact. CU Boulder research expenditures (including equipment, construction, operations, and labor) were estimated at $737M in FY2023–24. The economic contribution of these research activities totaled $1.4B on the Colorado economy in FY2023–24. A massive reduction in CU Boulder's research budget would immediately and seriously jeopardize these contributions to the local region.

10. The funding CU Boulder receives from NSF supports critical and cutting-edge research that enhances U.S. scientific competitiveness, supports advanced workforce development, and contributes directly to national security by accelerating breakthroughs in quantum technologies, AI, engineering, and space physics. Millions of Americans benefit from and depend on this research. For example:

a. The University of Colorado Boulder is at the forefront of quantum science and engineering, advancing a nationally recognized research ecosystem anchored by NSF investments. CU Boulder leads the NSF Quantum Systems through Entangled Science and Engineering (Q-SEnSE) institute, which investigates tools for a national infrastructure in quantum sensing and trains a quantum savvy workforce, and the Science and Technology Center on Real-Time Functional Imaging (STROBE), which leverages quantum-enabled imaging to study dynamic processes at the nanoscale. The JILA Physics Frontier Center (PFC), a longstanding NSF-

supported center, drives foundational discoveries in quantum optics, ultracold atoms, and precision measurement, while various other NSF-funded quantum projects advance applications in quantum communications. CU Boulder's growing quantum research infrastructure is further supported through NSF Major Research Instrumentation grants, the forthcoming National Quantum Nanofabrication (NQN) facility, and workforce development programs, including workshops and education research focused on quantum career pathways. These initiatives advance the United States' leadership in quantum technologies, promote economic competitiveness, and support national security through next-generation sensing, navigation, secure communication, and advanced computing capabilities. In Colorado, 3,000 workers are employed in the quantum workforce today, supporting the growth of more than 30 companies leading advancement in quantum tech— the largest cluster of quantum companies in the nation. Facilities such as the NQN, coupled with Q-SEnSE, STROBE, and PFC, are accelerating the transition of cutting-edge quantum research from the laboratory to the market and facilitating a vibrant startup and scale-up ecosystem.

b. The University of Colorado Boulder conducts NSF-funded research in artificial intelligence that advances responsible, next-generation technologies in areas such as machine learning, human-computer interaction, data-driven decision-making, and trustworthy autonomous systems. CU Boulder's NSF AI Institute for Student-AI Teaming (iSAT), which develops AI tools to support collaborative learning, is currently under review for renewal. If capped at 15%, the Institute would be unable to sustain its current level of operations. This shortfall would result in the loss of

key personnel whose specialized expertise is vital to fulfilling the iSAT's mission. The AI Institute promotes AI literacy in schools, and the weaving of AI concepts into subjects like math, science, history, and even the arts. It provides the opportunity to develop material for age-appropriate exposure for the introduction of simple concepts to young students and advancing to more technical applications for older students. Moreover, through the Institute activities teachers across subjects will be expected to understand AI principles, including ethics, algorithms, and applications (See, e.g., "Advancing Artificial Intelligence Education for American Youth," April 23, 2025.). CU Boulder also plays a leadership role in the NSF's National AI Research Resource (NAIRR) pilot, helping expand access to AI infrastructure nationwide. Across its broader AI portfolio, CU Boulder's research supports national priorities by improving cybersecurity, enhancing public infrastructure, and enabling transparent, reliable AI systems for critical applications in defense, disaster response, and secure communications.

c. The University's NSF-funded engineering research is focused on improving technologies such as wireless communications, power grid control, advanced sensing systems, and medical diagnostics. These efforts contribute directly to national security by enhancing the reliability of critical infrastructure, supporting secure data and communication systems, and advancing technologies with applications in defense, aerospace, and emergency response.

d. CU Boulder's Laboratory for Atmospheric and Planetary Science (LASP) conducts a robust portfolio of NSF-funded research focused on solar, space, and atmospheric physics to advance understanding of geospace environments and their interactions

with planetary systems. Projects include investigations into solar flares, energetic particle precipitation, ionospheric variability, and magnetospheric dynamics—critical phenomena that impact satellite operations, communications infrastructure, and global climate models. Through advanced laboratory measurements and modeling this research enhances national capabilities in space weather forecasting, supports the safety and resilience of space-based technologies, and contributes to U.S. leadership in heliophysics and planetary science.

e. CU Boulder's Institute for Arctic and Alpine Research (INSTAAR) conducts interdisciplinary on complex earth systems. It collects long-term environmental data collection in some of the fastest-changing regions and utilizes cutting-edge technology for detection, simulation and processing samples.

11. Prior to April 18, 2025, $19.4M of this overall NSF funding supported 13 projects at the University of Colorado Boulder that specifically seek to promote participation in STEM fields by women, minorities and people with disabilities. As of the date of this declaration, 7 of those have had their funding canceled.

12. Recovering costs of research, including indirect costs or research, is essential to maintain the operations of research universities, including the University of Colorado Boulder. To perform research sponsored by federal agencies, CU Boulder incurs a variety of significant costs that it would not otherwise incur. Indirect cost rates for federally sponsored research enable CU Boulder to recover some, but not all, costs for university infrastructure that facilitates multiple projects but is not specifically attributable solely to one of them. This includes things like maintaining sophisticated high-tech laboratories and secured cyberinfrastructure and data repositories; basic utilities like light, heat and telecommunications; hazardous waste disposal;

and the administrative apparatus necessary to comply with a broad range of legal, regulatory, and reporting requirements. Such shared resources not only support pioneering research facilities and research teams, but also the personnel and systems that are needed for them to work. As a result, a significant portion of CU Boulder's NSF funding is derived from indirect cost reimbursements.

13. Recovery of CU Boulder's indirect costs is based on predetermined rates that have been negotiated and agreed between the University of Colorado Boulder and the federal government through the Department of Health and Human Services based on review of CU Boulder's actual costs of conducting research. That process is established by regulation. The resulting negotiated rate for the University of Colorado Boulder is 56.5%. CU Boulder's negotiated rate agreement with the federal government is effective until amended with negotiations for an updated rate agreement currently active with DHHS.

14. Based on the predetermined indirect cost rate of 56.5%, which was agreed upon by the federal government as of 2022 and applying that rate to the direct costs (as modified pursuant to the CFR), the University of Colorado Boulder reasonably expects to receive approximately $30.2M in indirect cost recovery on an annual basis over the next five years. If—contrary to what CU Boulder has negotiated with the federal government—the indirect cost rate was reduced to 15% for new awards, that would significantly reduce CU Boulder's anticipated annual indirect cost recovery. For example, applying the 15% rate to the anticipated modified direct costs over the next five years, CU Boulder's anticipated annual indirect cost recovery for NSF awards would be reduced by $22.2M from $30.2M each year to $8M a year.

15. This loss will have an immediate deleterious impact on the success of CU Boulder's NSF sponsored research projects and ability to maintain staff and infrastructure critical to those projects.

16. The University of Colorado Boulder has relied on NSF's longstanding acceptance of the University of Colorado Boulder's indirect cost rates negotiated and agreed with the federal government to develop its budget and make capital infrastructure investments that make it possible for research to happen at CU Boulder currently and in the future.

17. For example, research funding is typically awarded through competitive grants processes, meaning that the annual research budget varies from year to year and is dependent on the success of CU Boulder's researchers in these competitions. Federally supported research comes to CU Boulder in a combination of both single- and multi-year awards. NSF awards are typically multi-year projects. In CU Boulder's NSF portfolio of 594 active awards, 574 (97%) are multi-year awards. CU Boulder's anticipated incremental funding in federal fiscal year 2025 is $13.2M and in federal fiscal year 2026, $12.2M. CU Boulder can produce budget estimates for planning purposes in reliance on the indirect cost rates periodically negotiated with the federal government.

18. NSF promotes research, education, and training, at CU Boulder and other universities through a strategic combination of funding for many individual research projects, as well as support for a few very large, long-term research centers and institutes that involve multiple institutions through subawards. NSF center and institute awards, unlike the thousands of individual investigator awards, routinely provide continuous funding for periods of over five years before NSF again opens the program to competitive renewal. As previously mentioned, CU Boulder runs a number of such NSF-funded centers and institutes including Q-SEnSE,

STROBE, PFC and iSAT. Some of these programs put CU Boulder in a grant management role, redistributing NSF's funding through subawards to other institutions nationwide as well as to CU Boulder's researchers.

19. Because CU Boulder's current annual budget was set with the expectation that CU Boulder would receive the indirect cost rates agreed to with the federal government, NSF's suddenly announced reduction will cause budgetary and operational chaos that will have an immediate negative impact on the research projects and programs.

20. NSF's plan to cap indirect cost recovery rates creates confusion and uncertainty for the University of Colorado Boulder and the programs we oversee. The reduction required will leave holes in the budgets that support the facilities and staff where CU Boulder's federally sponsored research occurs and will stop us from serving and meeting some of our critical missions, including education and research. In addition, CU Boulder is currently in the process of constructing a new academic and research facility aimed at advancing research and educational opportunities in chemistry and applied mathematics. The facility will host modern research laboratories for chemistry, applied mathematics and specialized quantum research, supporting research missions in analytical spectroscopy, environmental chemistry and computational mathematics. The estimated cost of this facility is $177M, of which $4M annually in indirect cost recovery funds are anticipated to be used to meet debt service obligations. An ICR reduction to 15% would put this project at risk as the reduction of ICR would put tremendous pressure on CU Boulder to finance this critical project.

21. On an annual basis, the federal government is the largest single sponsor of the University of Colorado Boulder's research. NSF's cap would almost certainly mean that many individuals (including faculty, staff, and students), programs, and initiatives receiving NSF

funding will be forced to significantly scale back or halt research. This outcome will be potentially devastating to research projects, the training of research personnel, and to CU Boulder's research enterprise regardless of discipline.

22. NSF's plan to reduce federal funding by capping indirect cost recovery at 15% would be devastating for the University of Colorado Boulder's research and educational mission, particularly in the areas of science, engineering and mathematics.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Executed this 16 day of May 2025, in Boulder, Colorado.

Signed by:
Justin Schwartz
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Dr. Justin Schwartz, Chancellor