
Testimony of
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Director for Geoscience Policy
for the
Geological Society of America
Regarding the
National Science Foundation
and
National Aeronautics and Space Administration
FY 2024 Appropriation
to the
U.S. Senate
Committee on Appropriations
Subcommittee on Commerce, Justice, Science, and Related Agencies
April 14, 2023

The Geological Society of America (GSA) supports increased investments in geoscience research and education at the National Science Foundation (NSF) and National Aeronautics and Space Administration (NASA). GSA encourages Congress to appropriate at least \$11.9 billion for NSF in Fiscal Year 2024 and provide increases to NASA's Science Mission Directorate, particularly its Earth Science and Planetary Science Divisions. Increases in funding will allow NSF to continue to support its core basic research in addition to growing the programs and initiatives authorized in the landmark bipartisan CHIPS and Science Act of 2022 (H.R. 4346) and allow NASA to maintain of a balanced portfolio of current and new science missions and research. Earth and space science at NSF and NASA play a vital role in American prosperity, security, and competitiveness through locating and characterizing mineral and energy resources that underpin economic growth; researching and monitoring natural hazards that threaten U.S. and international security; informing communities about the impacts of a changing climate; and assessing water quality and availability. Investments in NSF and NASA must also be used to broaden the participation in science of those traditionally underrepresented in STEM fields.

GSA is a scientific society with 19,000 members from academia, government, and industry. Through its meetings, publications, and programs, GSA enhances the professional growth of its members and promotes the geosciences in the service of humankind. GSA encourages cooperative research among earth, life, planetary, and social scientists, fosters public dialogue on geoscience issues, and supports all levels of earth science education.

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National Science Foundation

The Geological Society of America (GSA) appreciates the increase to the National Science Foundation (NSF) budget in FY 2023 and thanks the Committee for recognizing the important role that the agency plays in our country's global competitiveness. We urge Congress to provide NSF at least \$11.9 billion in FY 2024. Increases in funding will allow NSF to continue to support its core basic research in addition to growing the programs and initiatives authorized in the landmark bipartisan CHIPS and Science Act of 2022 (H.R. 4346).

Sustained increases beyond inflation are necessary to regain America's leadership in science and technology, and to enable discoveries that lead to future innovation and industries. NSF consistently receives many more high-quality proposals than it can fund. For example, the [Merit Review Process Fiscal Year 2020 Digest](#) noted that "Approximately \$3.9 billion was requested for declined proposals that were rated Very Good or higher in the merit review process—proposals that, if funded, may have produced substantial research and education benefits."

Geoscience research is a critical component of the overall science and technology enterprise and a key contributor to groundbreaking research across disciplines at NSF. Increased investments in NSF's geoscience portfolio are necessary to address pressing issues including natural hazards; energy, mineral, and water resources; and STEM education.

- There is a vital need to understand the abundance and distribution of critical mineral resources, as well as the geologic processes that form them, as articulated in the Energy Policy Act of 2020. NSF's Division of Earth Sciences supports research on the structure, composition, and evolution of the Earth, and the processes that govern the formation and behavior of the Earth's materials. This research contributes to a better understanding of the natural distribution of mineral and energy resources.
- The quality and quantity of surface water and groundwater have a direct impact on the wellbeing of societies and ecosystems, as evidenced by flooding and drought impacts experienced across the U.S. during the past year. NSF's research addresses major gaps in our understanding of water availability, quality, and dynamics, including the impact of both a changing climate and human activity on the water system.
- The Division of Atmospheric and Geospace Sciences provides critical infrastructure and research funding for understanding our planet, including weather and precipitation variability, atmospheric conditions, and space weather hazards. NSF is a key partner in obtaining data necessary to predict severe space weather events, which affect the electric power grid, satellite communications, and navigation systems, as noted in The Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow Act (PROSWIFT Act), which was signed into law in October of 2020.
- Natural hazards are a major cause of fatalities and economic losses. NOAA found that the [U.S. disaster costs for 2022](#) exceeded \$165 billion. An improved scientific understanding of hazards will reduce future losses by informing effective planning, mitigation, and resilience strategies. NSF investment in fundamental Earth science research and facilities underpins innovations in natural hazards monitoring and warning systems.

National Aeronautics and Space Administration

GSA appreciates past committee support of NASA science and requests increases to NASA's Science Mission Directorate, including to its Earth Science and Planetary Science Divisions, in FY 2024 as proposed in the President's budget request.

Increased funding for Earth Science will allow NASA to maintain of a balanced portfolio of current and new science missions and research. In addition, new investment is critical to implement the recommendations of the National Academy of Sciences report, [*Thriving on Our Changing Planet: A Decadal Strategy for Earth Observation from Space*](#). The report notes:

“Earth science and derived Earth information have become an integral component of our daily lives, our business successes, and society's capacity to thrive. Extending this societal progress requires that we focus on understanding and reliably predicting the many ways our planet is changing.”

The data and observations from Earth observing missions and research are tremendously important for natural resource exploration and land use planning, as well as for assessing water resources, natural disaster impacts, and global agriculture productivity. The Landsat satellites have amassed the largest archive of remotely sensed land data in the world. GSA supports interagency efforts to ensure the future viability of Landsat satellites as well as funding for Landsat Next to increase the capabilities and uses of multi-spacecraft constellations of small scientific satellites.

By looking at our planet as an integrated system, NASA's Earth and climate science efforts are among the nation's most effective tools to understand and tackle climate change. For example, NASA's Earth System Observatory consists of a series of Earth-focused missions that will create a holistic view of the Earth to provide key information related to climate change, natural hazards, and agricultural processes. High-priority missions such as PACE (Plankton, Aerosol, Cloud, ocean Ecosystem mission), CLARREO (CLimate Absolute Radiance and Refractivity Observatory) Pathfinder, and NISAR (NASA-ISRO Synthetic Aperture Radar), will provide key data to understand our changing planet and its natural resources. In addition, NASA's proposal to create an Earth Information Center will make data more accessible to communities most affected by climate change.

Increased funding for Planetary Science will strengthen American leadership in science, technology, and innovation, and inspire the next STEM workforce generation. The U.S. has historically led the way in exploring our solar system, demonstrating how American values of scientific integrity, transparency, and cooperation can be used to tackle challenging and visionary feats like landing humans on the Moon, and exploring the most distant planets in our solar system. Support for the planetary science priorities identified in the recent decadal survey, [*Origins, Worlds, and Life: A Decadal Strategy for Planetary Science and Astrobiology 2023-2032*](#), will further this mission by expanding NASA's lunar presence and exploration abilities through the Artemis program, and eventually landing humans on Mars. Other high-priority missions like Mars Sample Return, Europa Clipper, and Dragonfly will make unprecedented leaps in NASA's scientific and engineering capabilities, bringing samples from another planet back to Earth for the first time, and exploring moons in the outer solar system that may harbor

extraterrestrial life. Furthermore, planetary exploration has stimulated advances in numerous fields of study and supported the development of new technologies. For example, spacecraft camera design has led to many developments in charge-coupled devices (CCDs), the basis for practically every modern imaging device, whether used in a pocket camera, a smart phone, or security systems. Planetary and Earth exploration are intrinsically linked: scientific and technological advancements from one can be adapted and utilized by the other, while cuts to one can likewise hinder the other.

Support Needed to Ensure a Diverse Community of Future Innovators

For the United States to remain a global leader, the nation must provide greater investment in its people, and create a STEM workforce that reaches traditionally underrepresented gender, racial, ethnic, and geographic groups and communities. NSF's Education and Human Resources Directorate studies and improves the way we teach science, and provides research and fellowship opportunities to students that encourage them to continue in the sciences. Similarly, NASA's Office of STEM Engagement educational programs that span the K-12 to graduate levels have inspired and led many into science careers. GSA fully supports these efforts, as well as additional programs to make the geoscience workforce more diverse.

Funding is needed to ensure that the provisions in the CHIPS and Science Act that increase diversity in the scientific enterprise are implemented. GSA recommends fully supporting the "Eddie Bernice Johnson INCLUDES Initiative," as well as provisions in the CHIPS and Science Act drawn from the STEM Opportunities Act, Rural STEM Education Act, The Minority Serving Institutions (MSI) STEM Achievement Act, and Combating Sexual Harassment in Science Act.

Please contact GSA Director for Geoscience Policy Kasey White to learn more about the Geological Society of America – including GSA Position Statements on water resources, planetary research, energy and mineral resources, natural hazards, climate change, and public investment in Earth science research.