

2 April 2015

Dear Representative,

As this new Congress prepares to mark up legislation to authorize the National Science Foundation (NSF), the undersigned geoscience organizations and our tens of thousands of members urge you to recognize that investment in geoscience research is essential to the well-being and prosperity of the United States and its citizens. Our members are Earth and space scientists and universities advancing scientific research for the good of our nation and world, and their work represents many more examples than the programs and initiatives noted in this letter.

Driving Economic Prosperity and Energy Security

NSF’s Geosciences Directorate (GEO) provides about 61 percent of the federal funding for basic research in the geosciences at academic institutions.ⁱ This research not only expands our understanding of Earth, ocean, atmospheric, and polar science but also trains the next generation of geoscientists and geo-engineers. Geoscientists work in research and consulting positions spanning academia, industry, and federal and local government.

Table 1. Current grant money (in thousands of dollars) awarded by NSF’s Geoscience Directorate to institutions for a sampling of states.

| State | Texas | Michigan | South Dakota | Virginia | Illinois | Florida |
|--------------------------------------|-----------|----------|--------------|----------|----------|----------|
| Awards (thousands of dollars) | \$120,000 | \$37,000 | \$2,000 | \$56,000 | \$55,000 | \$81,000 |

Earth science provides an invaluable talent pool for innovative research, public and environmental safety, and natural resources exploration and management, including America’s oil and gas industry. A large portion of geosciences graduates – 28 percentⁱⁱ – pursue careers for oil and natural gas extraction companies. Texas leads the nation in the number of geoscience graduates and current geoscience students and employs more geoscientists than any other state in the U.S.ⁱⁱⁱ

NSF’s GEO Directorate Helps Protect Lives, Business, and Infrastructure

The economic and public welfare consequences of natural hazards, such as droughts, hurricanes, space weather, and earthquakes, can be devastating. When we consider the effort, time, and costs of rebuilding infrastructure, protecting resources, and restoring communities in the wake of these events, greater knowledge and prediction ability is essential.

GEO supports national research efforts to study natural hazards, as well as efforts to improve forecasting and community resilience. For example, GEO’s Atmospheric and Geospace Sciences Division, along with partner agencies like NOAA, supports the development of weather prediction models and instruments, as well as field campaigns.^{iv} Tornadoes, which cause roughly 70 deaths and 1,500 injuries annually, can be predicted up to an hour in advance thanks to programs like the University of Oklahoma’s Center for Analysis and Prediction of Storms (CAPS), developed through these partnerships.^v

Space weather results from solar storms that travel to Earth. While a less visible threat than most extreme weather, space weather can damage sensitive spacecraft and satellites and cause surges in power grids, with a direct global economic impact of about \$200 million per year.^{vi} GEO supports research on space weather through efforts like the Solar Heliospheric and Interplanetary Environment (SHINE), a research community that aims to improve physical understanding and predictive capabilities of these solar phenomena.^{vii}

When microscopic algae populations explode, they create harmful algal blooms commonly called “red tide.” Toxic algae can lead to illness or death in humans and marine life, and even non-toxic blooms damage ecosystems, fisheries and recreation facilities. These blooms cost the U.S. economy at least \$82 million dollars per year^{viii}. GEO’s Water, Sustainability and Climate program supports projects seeking innovative ways to detect and mitigate the damage, including a partnership between the University of Miami and NASA that uses existing satellite imaging technology to identify red tides off of the Gulf Coast.

New Frontiers in Innovation

Development of community-driven cyber-infrastructure is an emerging opportunity in the geosciences. The next generation of geoscience research will require greater computing expertise by geoscientists and increased understanding by computer scientists of the geosciences. NSF’s GEO directorate, through its EarthCube project, is developing the framework to provide cross-disciplinary open access to data, resources, software, and services, and has awarded more than \$25 million in funding to more than 2,500 scientists, educators, data managers, and many others.

In order to continue crucial and cutting edge programs such as these, we encourage robust funding for the geosciences and oppose any cuts to the NSF GEO Directorate. America’s economic competitiveness, public safety, and national security depend on our commitment to invest in the Earth and space sciences. Our organizations urge that you set forth a vision to spur science innovation and growth that recognizes the vital role of the geosciences.

Sincerely,
American Geophysical Union
American Geosciences Institute
American Institute of Professional Geologists
Association for the Sciences of Limnology and Oceanography
Consortium for Ocean Leadership
Geological Society of America
National Ground Water Association
Soil Science Society of America

ⁱ National Science Foundation. <http://www.nsf.gov/geo/about.jsp>

ⁱⁱ American Geosciences Institute.

http://www.americangeosciences.org/sites/default/files/cwilson/ExitSurvey_101614_MedResWithLinks_0.pdf

ⁱⁱⁱ American Geosciences Institute. 2014. Status of the Geoscience Workforce. Chapter 3: Trends in Four-Year Institution Geoscience Programs.

^{iv} National Science Foundation. 2013.

http://www.nsf.gov/discoveries/disc_summ.jsp?org=GEO&cntn_id=128092&preview=false

^v University of Oklahoma Center for Analysis and Prediction of Storms. <http://www.caps.ou.edu/>

^{vi} National Research Council. 2008. Severe Space Weather Events – Understanding Societal and Economic Impacts. Workshop Report.

^{vii} Solar Heliospheric and Interplanetary Environment. <http://www.shinecon.org/>

viii National Oceanic and Atmospheric Association.
http://www.cop.noaa.gov/stressors/extremeevents/hab/current/hab_econ.aspx