



NSF Broader Impacts for Geosciences



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Career Path

BS/BA: Geology/English -
Vanderbilt University

MS: Marine Geology –
Duke University

Joint Oceanographic
Institutions

National Science Foundation
Division of Ocean Sciences
Office of Polar Programs



From "World Ocean Floor Panorama", Authors Marie Tharp and Bruce C. Heezen, 1977. Copyright by Marie Tharp 1977/2003.



NSF Review Criteria: Just two!

1) Intellectual Merit:

- Does it advance knowledge?
- Is it innovative and important?

2) Broader Impacts:

- Does it benefit society?
- Multiple options – education, diversity, infrastructure, science



* Sometimes with “additional solicitation specific criteria”!



Intellectual Merit: Programs in the Directorate of Education and Human Resources (EHR)



- Intellectual Merit of NSF Education programs
 - Knowledge-generating - How do people learn?
 - Hypothesis-driven
- Replication is OK, but must be research based and evaluated
- Broader Impacts for Education Programs – multiple options



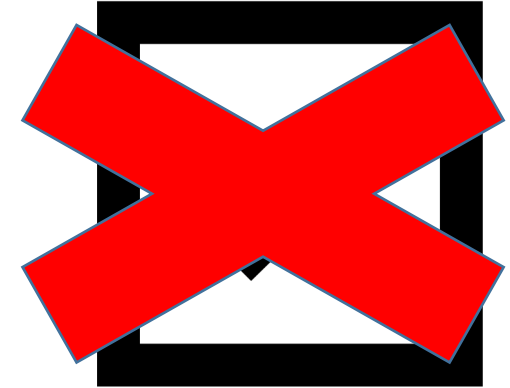
Directorate of Education (EHR) programs

- Improving Undergraduate STEM Education (IUSE: EHR)
- Advancing Informal STEM Learning (AISL)
- Discovery Research K-12 (DRK-12)
- INCLUDES



How are Broader Impacts used in Review?

- Not a check-list!
- Pay attention to the solicitation
 - CAREER proposals – Education is required
 - Mid-Scale Research Infrastructure – Student training and broadening participation
 - Coastlines and People (CoPe) proposals – Broadening participation is required



Broader Impacts and Geosciences

- Proposals to Geoscience programs often focus on infrastructure and education for their Broader Impacts.
- The Geosciences workforce is not diverse:
 - Bernard and Cooperdock, 2018
 - Please consider including DE&I as a broader impact in your future proposals.
 - As a reviewer, please comment on Broader Impacts!



Nature Geosciences, May 2018

comment

No progress on diversity in 40 years

Ethnic and racial diversity are extremely low among United States citizens and permanent residents who earned doctorates in earth, atmospheric and ocean sciences. Worse, there has been little to no improvement over the past four decades.

Rachel E. Bernard and Emily H. G. Cooperdock

The geosciences tackle the complexities of the Earth. Geoscientists also study how we, as a society, affect — and are affected by — the planet we live on. Complex problems that influence all segments of society, such as demands on diminishing natural resources and climate change, require the ingenuity of investigators with a broad variety of backgrounds. Increased diversity has clear benefits for scientific advancement: different perspectives and life experiences spark unique questions and approaches to

yet to make any significant strides toward increasing diversity at the PhD level. Efforts to increase diversity have primarily been focused on feeding the pipeline in schools and at the undergraduate level. Yet, at all degree levels, the geosciences remain the least diverse discipline within STEM³.

If we want to broaden the ethnic and racial range of people in the geoscience faculty, we first need PhD graduates who can fill the positions. We highlight the persistence of the geoscience doctorate

needs to rethink current strategies aimed at diversifying our academic departments.

Race and ethnicity over time

The number of PhDs awarded in the earth sciences to US citizens and permanent residents has been relatively stable — around 350 per year since 1973 (Fig. 1a) — whereas the number of ocean and atmospheric science PhDs have risen remarkably in the latest decade. Taking all three disciplines together, about 60% more PhDs were awarded in 2016, compared to 1973.



Broader Impacts and Geosciences

- GEO is focusing on DE&I as an important issue that must be addressed by both targeted programs and Broader Impacts in research proposals.
- Issues at all levels (undergraduate to faculty):
 - Recruiting
 - Retention
 - Promotion
- Environment Matters!



NSF Programs and DE&I efforts

- Directorate of Geosciences
 - GEOPaths
 - Geoscience Opportunities for Leadership Development (GOLD- EN)
 - Coastlines and People (CoPe)
- NSF-Wide
 - Research Experiences for Undergraduates (REU)
 - CAREER
 - INCLUDES



Improving Undergraduate STEM Education: Pathways into the Earth, Ocean, Polar and Atmospheric & Geospace Sciences (IUSE:GEOPaths)

Tracks

- Informal Networks
- Undergrad Prep
- Grad Opportunities

Solicitation

- NSF 20-516
 - LOI:
 - Nov 17, 2020
 - Deadline
 - Jan 26, 2021

Support

- Anticipated funding:
\$6,000,000
- ~ 18 awards

Need reviewers!!



GOLD-EN

Geoscience Opportunities for Leadership in Diversity – Expanding the Network

Current five projects listed at:
<https://cpaess.ucar.edu/gold>

Dear Colleague Letter: NSF 20-058
Deadline: June 26th, 2020

**Cultivate “diversity champions”
(critical for GEO)**

Leadership & Professional Development

To expand the reach of current GOLD efforts, bring to scale related diversity activities in the geosciences, or develop unique approaches for greater inclusion in the geoscience education and research community.

**Supplements, EAGERs,
Conferences/Workshops**

Research Coordination Networks (RCNs)



Coastlines and People (CoPe)



Solicitation NSF 20-567

Deadlines in 2020:

Focused Hubs:

Letter of Intent – August 10th

Proposals – Sept. 9th

Large-scale Hubs:

Letter of Intent - Sept. 28th

Proposals - October 28th

Goal: to transform understanding of interactions among natural, human-built, and social systems in coastal, populated environments.



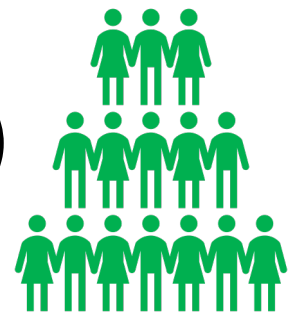
Research Experiences for Undergraduates (REU)

NSF 19-582 Deadline: August 28th/4th Wednesday

REU Supplements: to research awards for individual PIs who want to hire 1-2 students in their laboratories.



REU Sites: National search to develop cohorts of 10-20 students who are matched with a group of mentors & included Professional Development efforts (Deadline: August 27th)



Faculty Early Career Development Program (CAREER)

NSF 20-525

Deadline: Annual – July 27th/ 4th Monday in July

Must be Pre-Tenure; Requires Science plan & Education plan

5 year/ \$400K minimum



INCLUDES – One of NSF's 10 Big Ideas

- Planning Grants: Solicitation [19-600](#)
- Deadline July 13th, 2020
- Up to \$100K
- Alliances: Solicitation [20-569](#)
- Letter of Intent (required) is due October 5, 2020
- Proposal Deadline is January 26th, 2021
- Up to \$2 Million/year for 5 years

