

## 2019 Diversity Panel

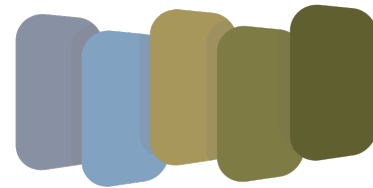
Dr. Lejo Flores, Boise State University

Dr. Aisha Morris, NSF

Dr. Anne U. Gold, CU Boulder

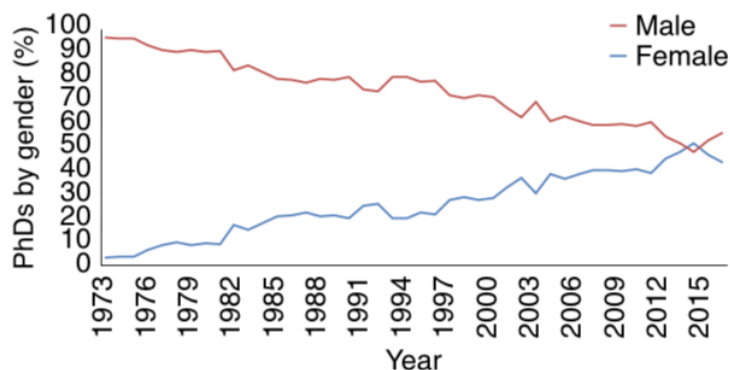
Dr. Kadidia Thiero, UCAR

Dr. Venkat Laksmi, University of Virginia



**CSDMS**  
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## a Earth sciences



Earth Sciences awarded PhD's show that gender balance is improving!

## 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 STEM<sup>1</sup>.

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.

# “Just the Facts”: 1973-2016

**Table 1 | Total number of doctorates awarded from 1973 to 2016, along with calculated percentages of race, ethnicity and gender for the most recent year in the dataset**

	Earth		Ocean		Atmospheric		All geosciences		2016 comparative percentages	
R&E	Cumulative number	Per cent in 2016	Cumulative number	Per cent in 2016	Cumulative number	Per cent in 2016	Cumulative number	Per cent in 2016	All S&E PhDs <sup>c</sup>	US population <sup>d</sup>
White	12,279	86	4,435	87	2,856	75	19,570	85	73	61
Asian	622	5	237	6	324	11	1,183	6	10	6
Hispanic or Latino	335	4	198	4	95	9	628	5	7	18
Black	115	1	58	0	59	4	232	1	6	12
Native American	52	1	15	0	7	1	74	1	<1	1
Other or unknown	523	<1	145	<1	95	0	763	<1	1	<1
Two or more races <sup>a</sup>	92	3	50	3	22	1	164	3	3	2
Total	14,018	100	5,138	100	3,458	100	22,614	100	100	100
Per cent URM <sup>b</sup>		6		4		13		6	13	31
Gender	Per cent over all years	Per cent in 2016	Per cent over all years	Per cent in 2016	Per cent over all years	Per cent in 2016	Per cent over all years	Per cent in 2016	All S&E PhDs <sup>c</sup>	US population <sup>d</sup>
Per cent male (all R&Es)	74	56	65	50	78	62	73	55	53	49
Per cent female (all R&Es)	26	44	35	50	22	38	27	45	47	51

<sup>a</sup>Only recorded since 2001. <sup>b</sup>URM totals only include Hispanic or Latino, Black and Native American individuals. <sup>c</sup>Source: National Science Foundation, National Center for Science and Engineering Statistics<sup>4</sup>.

<sup>d</sup>Source: Kaiser Family Foundation<sup>6</sup>. R&E, race and ethnicity; S&E, science and engineering; URM, underrepresented minority.

Underrepresented Minorities

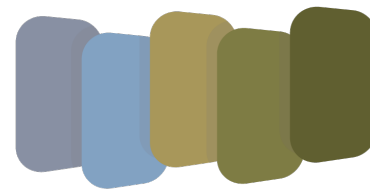
Gender

From: Bernard & Cooperdonck, 2018, Nature Geoscience.

# 2019 Diversity Panel

How we do better as a  
community?

What actions can individuals in  
the CSDMS community take to  
promote diversity, equity and  
inclusion?



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CSDMS 3.0 current actions to promote a diverse community

From the proposal “Broad participation of scientists and students from underrepresented groups remains a priority.”

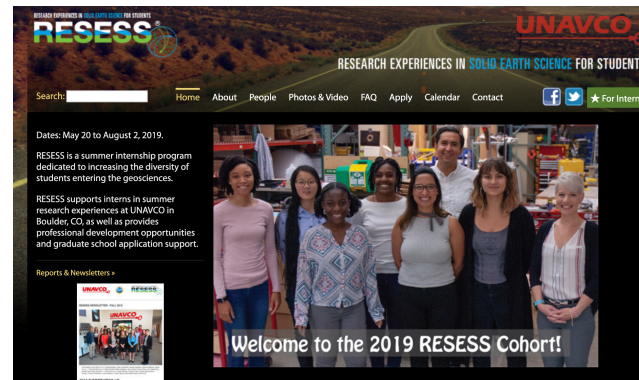
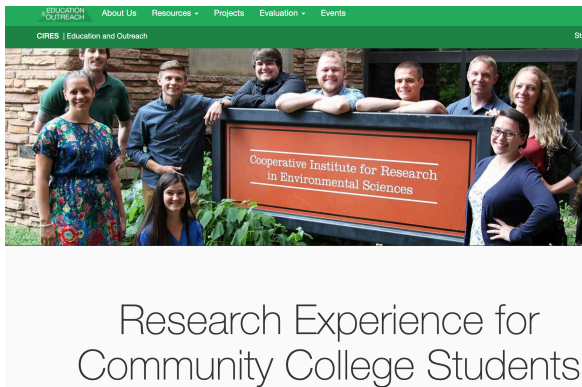
Women with geoscience doctorates remain underrepresented (estimates range from 13% to 17–23%), especially in leadership roles. CSDMS makes a conscious effort to promote research of all participants and to include people from all backgrounds in the leadership of the project: a.o. working group chairs and steering committee.

Our annual meeting always features diverse speakers, women make up 29% of CSDMS’ Executive Committee, and the steering committee features 40% women. The formation of Science Teams provides an opportunity to further increase diversity, and, especially, to seek early-career scientist participation in leadership. We will develop an open, transparent process for **populating Science Teams**, which takes into account diversity in career stage, gender, expertise, institutional origin (R1, four-year, HBCU, etc.), and other criteria. **Reach out one-on-one!**

At the earliest entry level, CSDMS offers **student stipends** for attendance at the Annual Meeting. Each year CSDMS offers five scholarships that aim to increase diversity. These scholarships are advertised nationally through the Institute of Broadening Participation (IBP), AWG’s etc.

# Links to REU programs discussed today

- RESESS: <https://resess.unavco.org/>
- RECCS: <https://cires.colorado.edu/outreach/RECCS>
- SOARS: <https://www.soars.ucar.edu/>
- NSF REUs: <https://www.nsf.gov/crssprgm/reu>

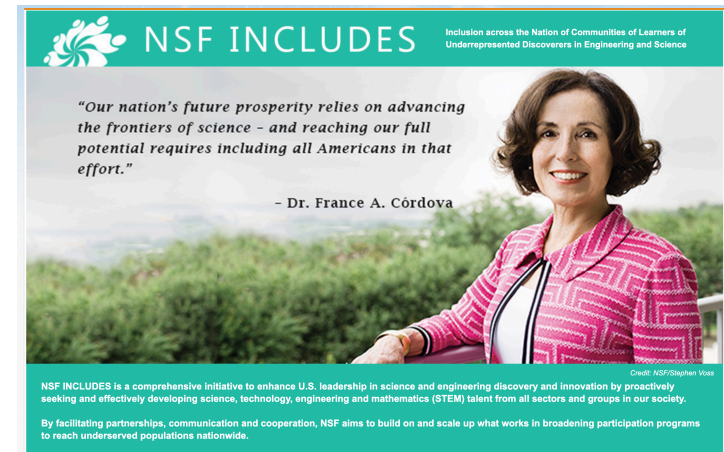


# Links to NSF programs discussed today

- NSF INCLUDES, <https://bit.ly/2z02B4u>

Opportunities at NSF-EAR at each career level:

- NSF Science Assistant: USAJobs.gov
- Graduate Research Fellowship Program: <https://www.nsf.gov/grfp>
- NSF Rotator program: <https://www.nsf.gov/careers/rotator/>



*Do earth surface processes modelers have a unique opportunity because the nature of our science is indoors and builds a skillset that is marketable? Should CSDMS broadcast that aspect of geoscience better?*

*What opportunities does the CSDMS see of reaching other communities?*

*Do the Geosciences need to promote better that we do societally relevant research?*

*Is the creation of online open-source software a way to broaden participation in earth surface process modeling? What can we do better? What would this involve? Make sure we do remove barriers!*

*Programming and software development can be off-putting for some people (especially with too many inside STARWARS references).*

*How can CSDMS be more inclusive? Should we have clinics on practical tips for creating an inclusive modeling team?*

*Some reading on this:*

*Chang, 2019. Brotopia: breaking up the Boys' Club of Silicon Valley*

*<https://qz.com/823162/a-new-study-shows-how-star-trek-jokes-and-geek-culture-make-women-feel-unwelcome-in-computer-science/>*

*Master et al., 2016. Computing Whether She Belongs: Stereotypes Undermine Girls' Interest and Sense of Belonging in Computer Science. Journal of Educational Psychology 2016, Vol. 108, No. 3, 424 – 437*