

## Questioning how we recruit students from marginalized communities into the geosciences

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Highlighting altruism in geoscience careers aligns with diverse US student ideals better than emphasizing working outdoors

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A common approach to attract students in the United States to the geosciences is to emphasize outdoor experiences in the natural world. However, it is unclear how successful this strategy is. Specifically, the geosciences have been less successful than other sciences at recruiting a diverse workforce that reflects different perspectives and life experiences. Here we present a survey of students enrolled in College Algebra at a Hispanic-serving institution in the southwestern United States where, of 1550 students surveyed, 55.3% identified as an underrepresented minority (URM). We find that surveyed students care little about working outdoors. Instead, they rate altruistic factors, such as helping people or the environment, as most important. Female respondents rate these factors higher than male respondents. We also find that many respondents know little about what a career in geoscience entails. We argue that better informing students about the altruistic potential of geoscience careers would be an effective strategy to broaden recruitment.





Check for updates



iGEM<sup>2</sup> 2017 Time (year) Wind Turbine Power Curve

This analysis developed out of an ongoing NSF Geopaths project supporting a partnership between geoscientists and mathematicians to contextualize math content with geoscience concepts in a mathematics course as a Hispanic-serving institution. Funding is from NSF ICER #1700896 to TJ, EMG, WAG; and NSF IER #1911454 to TJ and #1911482 to EMG and WAG.



## MOTIVATION:

Why does our field continue to bring in and retain new students from a population dominantly composed of nonminority male students, while other STEM fields attract and retain more diverse students?

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### SURVEY POPULATION:



Fig. 1 Student demographics from 1550 surveys of students enrolled in College Algebra compared with those in Environmental and Earth Sciences at a large, urban, Hispanic-serving, R1 public university in the southwestern United States. In all graphs, underrepresented minority (URM) students identify as Hispanic, Black or African American, or Native American and are shown in shades of blue, overrepresented or non-URM students identify as White or Asian and are shown in shades of orange, and students who identified their ethnicity as "other" in gray.

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# What do students value in a career?

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#### Descriptions of their "ideal career":





### **RESULTS**:

• "helping people and society" and "helping the environment" are **altruistic factors** (fulfilling 'communal goals') which survey respondents rated **the most important** 

• personal achievement factors (fulfilling 'agentic goals') included "making a lot of money" and "having prestige" and are rated highly, but less than the altrustic factors

 finally, the importance of the work environment were the lowest rated factors: "working outdoors" and "working in an office"



### **OTHER OBSERVATIONS:**

- underrepresented minority (URM) and non-URM female students included in this survey responded similarly for all factors
- the **largest differences** in our study **are between gender** and not ethnicity
- no significant difference between responses of students who were first-generation or non-first-generation



### RECRUITING UNDERREPRESENTED STUDENTS INTO THE EARTH SCIENCES





"...recruiting students based on the allure of the great outdoors may be an inherently self-selecting strategy that leads to the persistent underrepresentation of female and minority students in Earth Sciences. Since a majority of student survey respondents do not value careers in the outdoors, we are missing the opportunity to promote inclusiveness of students with a diversity of backgrounds."



We found that very few of the students know what careers exist in the geosciences (only 13.1% responded strongly agree or agree), in contrast to careers in biology (58.8% responded strongly agree or agree).





We suggest that "recruitment of students into the Earth Sciences should rely less on the allure of the great outdoors and more on the altruistic endeavors of Earth Science careers."



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Dr. Phil Bresnahan @insituphile

I learned that I've been making some incorrect assumptions-not surprisingly-about what motivates folks to join me in this field. Judging by the paper's title, I'm not alone in having made that incorrect assumption.



@drienicross

Thanks for publishing this. These data are well known by sociologists and student affairs professionals, but not so much by members of AGU. I'm excited to be able to cite this work!



Camille Thomas @lakemicrobes

Time to change the narrative



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Nicole D. LaDue, Ph.D. @DrLaDue · Nov 4, 2021 Replying to @RockDocRach and @GeoEdResearch

Yes - This article is so helpful. I'm ready to see our community use this context for promoting the geosciences.



Irina Overeem @IrinaOvereem

Bernard & Cooperdonck postulated it was possible URM students were more motivated by working on societal needs and environmental causes, and less by 'working in the outdoors'. Here is a study that gets to an answer. Yes, many students care more about helping people.

Samantha Carter @SamPaleoWise · Oct 7, 2021

New paper! Our latest research on recruiting a diverse workforce in the Earth Sciences has just been published with @SpringerNature in Communications Earth & Environment. Read here: nature.com/articles/s4324...

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# How does this apply to the School of Earth Sciences at OSU?







Course credit hours and enrollments have both held steady or gone up even as our number of majors has dipped The Ohio State University

### Strategies we are employing

- Extensive UG curriculum redesign in 2019, emphasizing new major track in **Climate**, **Water**, and **Environment**
- New requirement of "sophomore seminar" course on introduction to the major and careers in Earth Sciences
- Developing alternatives to traditional "boots on the ground" field camp
- Targeted "rebranding" of SES promotional/recruitment materials

....We would love to hear ideas about other innovative strategies



### RECRUITING UNDERREPRESENTED STUDENTS INTO THE EARTH SCIENCES

