

# Of rocks and social justice

Despite much emphasis on diversity in the US, geoscience remains one of the least diverse scientific disciplines. If we want to achieve and maintain diversity, we need to make our work environments welcoming to a broad spectrum of voices.

One only has to play a game of 'spot the geologist' in San Francisco during the American Geophysical Union meeting to notice that many geoscientists are cut from the same fleece. Indeed, one thing that attracts students to studying geoscience is its culture, where they can establish camaraderie with people of similar inclinations that share interests such as outdoors activities<sup>1</sup>. In other words, many geoscientists choose the field because they fit in. The consequence of this self-selection is a club of likeminded people. Although membership to this club is not exclusive in principle, in practice it can feel that way to those who do not fit the mould. If geoscience departments truly want to increase diversity — whether this refers to gender, race, ethnicity or anything else — the focus needs to be on cultivating a more welcoming academic culture in which a diverse chorus of voices is valued.

Geoscience is one of the least diverse fields of science at Western institutions. In the US, only about 7% of geoscience degrees at both undergraduate and graduate levels are awarded to underrepresented minorities<sup>1</sup>. The representation of women at degree level is better — they receive in excess of 40% of degrees<sup>1,2</sup> — although the representation of women of colour remains appalling. The proportion of women drops off rapidly higher up the career chain<sup>3</sup>. This so called leaky pipeline has been attributed to many factors, but evidence from letters of recommendation for postdoctoral positions suggests that women are disadvantaged due to their gender from the beginning of their geoscience careers (Dutt, *K. et al.* **9**, 805–808; 2016), most likely not by intention, but by unconscious bias. Those who fit the mould are seen as contributing more to their field than those who do not.

There is no shortage of diversity programmes, initiatives and dedicated

university administrators claiming to be championing diversity. But if these programmes are working, change has been decidedly slow. It has been shown that diversity programmes implemented by US corporations have not only failed to increase the representation of women and minorities in management roles, but some of these efforts have made the inequality even worse<sup>4</sup>. Funding diversity programmes allows companies and universities to say they are doing something to fix the problem, but better strategies that deliver actual progress are needed.

Two main challenges stand in the way of achieving a diverse geoscience workforce representative of society: we need to attract more people who have not been wearing checkered shirts, walking boots and rucksacks since secondary school, and we need to retain them. On the first point, geoscience departments should branch out. Computer scientists, lab biologists, theoretical physicists and chemists can all contribute key insights to understanding the Earth. And with an increasing focus on sustainable development, it is absolutely essential that all regions of the world and all parts of society are working together.

Children today learn relatively little about the geosciences before university, compared to the other branches of science. As a result, outdoors enthusiasm, positive undergraduate experiences and family support account for 80% of active geoscientists<sup>5</sup>. Conversely, for those to whom these factors do not apply, these doors into the field remain closed. Highlighting the diverse career opportunities and societal relevance of the geosciences could help to attract a broader range of students — after all, not all geoscience careers involve climbing mountains, rock hammer in hand.

And then there is the problem of retention. Students from minorities can

face systematic exclusion as they carve out careers. The prevalence of harassment — gender-based, race-based, or otherwise — in the academic workplace<sup>6</sup> tells us that many geoscience departments are a long way from being inviting environments.

Geoscience departments need to ensure that all of their members feel welcome, included, supported and appreciated. These cultural shortcomings are not easy to address, but deserve our energy. Mentoring programs can help, as can fostering support networks<sup>7,8</sup>.

Even if we manage to make our academic environments more diverse, that does not mean that they are also inclusive. If we want to maintain any gains in diversity, we must create environments in which all geoscientists (regardless of colour, gender or inclination to climb a mountain) can flourish. Only then can we hope to stamp out discrimination and bias in the workplace.

We owe it to our present and future colleagues to embrace all manner of people into the geosciences, just as we need diversity to tackle the hardest problems. To negotiate the tightening space within the planetary boundaries, two key prerequisites are a workforce that is representative of the world we live in, and as diverse a set of minds as we can get. □

## References

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